

**THE IMPACT OF TPACK AND TEACHER TECHNOLOGY EFFICACY ON
SOCIAL STUDIES TEACHERS' USE OF TECHNOLOGY IN THE
CLASSROOM**

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Wendy Marie Knapp

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Aaron H. Doering, Adviser

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remember, *“Never give up on a dream just because of the time it will take to accomplish it. The time will pass anyway.”* – Earle Nightingale

Abstract

Access to classroom technology and professional development does not ensure teachers will use technology in the classroom. According to Kopcha (2012) the availability of technology in classrooms has grown, yet a majority of teachers still report using technology most frequently for non-instructional tasks such as administrative work and communication with peers. This case study research describes the experience of three teachers who participated in a TPACK focused professional development workshop designed to improve their understanding of how to effectively use technology to teach social studies and whether participation in the workshop influenced teachers' technology efficacy and their TPACK while looking closely at why some teachers more readily adopt technology than others. The context of this study centered on teacher technology efficacy, as this is a strong indicator of behavior, (Moran & Hoy, 2001; Palak & Walls, 2009; Lee & Tsai, 2010) and the TPACK framework because it serves as a backdrop for discussion related to instructional decisions (Lee, M, & Tsai, C. 2007; Koehler & Mishra, 2009). Findings from this study suggest that participation in the workshop resulted in a positive change in behavior, improved technology self-efficacy, and increased ability to overcome obstacles and barriers associated with classroom technology integration among the participants studied. This information is useful to those engaged in the design of professional development. It further serves to inform social studies teachers on the type of professional development useful for learning how to effectively combine technology, content, and pedagogical strategies in the classroom. The testimony of these cases supports the notion that professional development that is thoughtfully designed, offers

content specific materials, while modeling implementation strategies with supported guidance is effective in the influence of teacher's use of technology in the classroom.

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Chapter 1

Introduction

Public school teachers in the United States participate in a variety of professional development courses to maintain their licensure and improve their practice. Professional development on a vast number of topics is offered in a wide variety of formats and delivered through numerous modalities. School districts often provide their teachers with in-house professional development, and many teachers seek professional development through outside sources such as colleges, universities, and for-profit organizations.

With the influx of personal computers in the classroom beginning in the early 1990s, technology-related professional development for U.S. public school teachers became a topic at the forefront of professional development research and development (Ertmer, 1999). But although millions of dollars in grant money has since been spent on pre-service and in-service teacher technology training, the 2016 National Education Technology Plan published annually by the United States Department of Education still cites teacher technology training as among its top goals for the year. Nonetheless, professional development is often criticized for failing to have an impact on teacher improvement (Hew & Brush, 2007; Inan & Lowther, 2010; Ottenbreit-Leftwich; Brush, Strycker, Gronseth, Roman, Adaci, vanLeusen, Shin, Easterling & Plucker, 2012; U.S. Department of Education, 2016). Efforts to improve the use of technology among classroom teachers are not producing the desired results. According to Kopcha (2012) the availability of technology in classrooms has grown, yet a majority of teachers still report-using technology most frequently for non-instructional tasks such as administrative work and communication with peers. The reasons for the existing gap

between technology access and use are well documented in the literature. A review of experimental studies from 1995- 2006 by Hew & Brush (2007) identified 123 barriers to technology integration and organized them into six main categories: resources, knowledge and skills, institution, attitudes and beliefs, assessment and subject culture. Furthermore, Ertmer (1999) classified first order barriers as those obstacles that are external to teachers such as lack of resources, institution, subject culture and assessment and second order barriers as attitudes and beliefs, and knowledge and skills. It is useful to define barriers using Ertmer (1999) classification because arguably, first order barriers are obstacles that are beyond the control of the teacher while second order barriers; attitudes and beliefs are unique to the individual. First and second order barriers influence the behavior of teachers and will be examined in this study. One way to help teachers overcome barriers is to provide professional development opportunities. Avalos (2011) contends, "...professional development is about teachers learning, learning how to learn, and transforming their knowledge into practice for the benefit of their students' growth" (p. 10). If we are able to understand more about how teachers learn and transform their knowledge into the classroom we will be better positioned to help teachers break down barriers

Among the disciplines in which teachers need improved technology trainings is social studies. As researchers have noted, employing technology in the classroom can provide a gateway to the people, environment, and topics at the very core of social studies education. As Robyler and Doering note, "The social studies teacher often needs to be a 'jack of all trades' and hopefully a master of more than one content area" (2010, p. 347), given that according to National Council for the Social Studies (NCSS), "social

studies provides coordinated, systematic study drawing upon such disciplines as anthropology, archaeology, economics, geography, history, law, philosophy, political science, psychology, religion, and sociology, as well as appropriate content from the humanities, mathematics, and natural sciences “ (NCSS, 2016). Within the social sciences, the use of multimedia, Hofstetter (2001) contends, particularly lends itself to geography, which is a highly visual discipline. Yet, geography teachers have been found to be notoriously slow in adopting and implementing technology in the classroom. Martorella (1997), for instance, has referred to technology use in the geography classroom as a “sleeping giant,” warning that when the field awakes, it may discover that technology has taken on new meaning and applications in schools, some with far-reaching implications for our society (p. 511).

To remedy this situation, teacher education programs and school administrators need to better understand how to effectively deliver professional development opportunities for social studies teachers that will allow them to have successful experiences with technology in the classroom. To transfer successfully to the classroom, this training needs to advance beyond simply learning how to use the tools of technology to developing a more holistic approach connecting technology to content in meaningful ways. One way to identify the elements of such effective teacher training and professional development is to uncover the factors that have contributed to the success of models that have been proven to be effective.

One such professional development program is the Minnesota Alliance for Geographic Education (MAGE) Summer Institute. MAGE has developed a reputation for delivering high-quality and well-run professional development experiences for social

studies teachers interested in advancing their knowledge of social studies content, their ability to teach the content, and their use of technology in the classroom (Doering, Koseoglu, Scharber, Henrickson, & Lanegran, 2014). The MAGE Institute is built around the Technological Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Kohler (2006) that, extending the work of Shulman (1986), serves to guide the way teachers think about technology in the classroom. This framework emphasizes the need for teachers to consider technology, pedagogy, and content knowledge together when planning learning activities. MAGE's success suggests that TPACK can be used as a model to help teachers think about technology in new ways and to consider how technology fits into their teaching practices.

Accordingly, this study seeks to identify how the participation of social studies teachers enrolled in the MAGE Summer Institute influences their teaching practice and decisions to integrate technology in their classroom. By so doing, it hopes to contribute new insights into the barriers that must be overcome to accomplish technology integration and into the impact of improving teachers' technology efficacy on their behavior in the classroom.

Statement of the Problem

Although strides have been made to improve technology and teacher development, there is much more work that needs to be done. As Demirci (2009) contends, "rapid technological development is giving teachers new opportunities to test many more software packages and websites in their lessons" (p. 43). While the affordances of technology are plentiful, integration is slow. Teachers have yet to realize

high levels of effective technology use both in the United States and internationally (Ertmer & Ottenbreit, 2010). Access alone is not enough to establish technology integration in the classroom (Inan & Lowther, 2010) because there are a variety of factors that influence teachers' use of technology, making it difficult to predict with certainty the level and degree to which teachers will choose to implement technology. According to the National Education Technology Plan (NETP), "Across the board, teacher preparation and professional development programs fail to prepare teachers to use technology in effective ways" (NETP, 2016).

Although much research has been conducted to examine teachers' attitudes toward technology (Ertmer, 2005; Palak & Walls, 2009; Ertmer & Ottenbreit-Leftwich, 2010), less has examined how teacher attitudes about technology are shaped by participation in professional development that results in classroom technology integration. This study will contribute to current knowledge by examining how teachers participating in a professional development workshop in classroom use of technology approach, learn, and use technology in their content area. Through this case study research, I will attempt to identify what factors help teachers learn to use and become comfortable with technology and what factors influence their decisions to use technology in the classroom. Its findings will serve to inform what constitutes effective technology infused professional development.

Research Questions

Access to technology and professional development does not ensure teachers will use technology in the classroom. Knowledge, skills, beliefs and attitudes influence

teachers' decisions to use technology. A gap exists in our understanding of how professional development impacts teachers' understanding of TPACK and their efficacy toward technology, in that access to technology and technology- focused professional development does not ensure teachers will use technology in the classroom.

The guiding research question in this study sought to examine how participation in an institute emphasizing technology, content, and pedagogy influences a social studies teacher's teaching practice and decision to integrate technology in their classroom.

The specific research questions for this study are:

1. How does a TPACK-focused professional development experience focused within the social studies influence the development of technology efficacy and TPACK in social studies teachers?
2. How do teachers' beliefs about technology efficacy and TPACK influence their use of technology in the classroom?
3. Why do some teachers more readily adopt technology use in the classroom than others?
4. What factors of a TPACK-focused professional development appear to have the strongest effect on teachers' actual integration of technology in the classroom?

Significance of the Study

There is a need to move forward more purposefully with the integration of technology in the classroom. "Much of the activity under way on multiple levels of the educational system is driven by a very strong perceived need for action, but it is often not guided by any substantial knowledge base derived from research about what works and

why with regard to technology, teaching and learning” (Lawless & Pellegrino, 2007, p. 576).

With forward movement in mind, the main focus of this study will be to carefully examine how participation in an institute dedicated to geographic education standards, geo technologies, and authentic pedagogies impact teachers’ understanding of TPACK and their efficacy toward technology. Awareness and consideration for the factors affecting teachers’ use of technology in the classroom may provide additional insight for those interested in designing and conducting professional development aimed at improving teachers’ use of geospatial technologies. This study will contribute to the existing research on the use of technology among high school geography teachers.

Conceptual Framework

The main constructs framing this study are reflective thinking, TPACK, and teacher technology self-efficacy. This study examines professional development by studying the intersection of TPACK and teacher technology self-efficacy on teachers’ decisions to use technology in the classroom. To obtain this information, teachers were asked to reflect on their practice by answering questions through surveys, focus group questions, and interviews.

Reflective thinking has been shown to be a powerful component of classroom teaching (Posner 2000; Schön, 1983). Teachers make decisions throughout the day that influence the activity in their classroom. These decisions establish expectations and direction and set the tone of the classroom. Posner (2009) contends, “reflective teachers actively, persistently, and carefully consider and reconsider beliefs and practices in light

of the grounds that support them and the further consequences to which they lead” (p. 21). Reflective thinking in the context of this study is important for two reasons. First, it is through teacher self-reflection that I am able to gain access to teachers’ experiences. Second, “teachers (especially effective ones) balance intuitive and reflective thought, using any resources they can find and adapting materials to suit their own purposes and methods” (Posner, 2005, p. 25) it is therefore imperative to provide them with tools that help facilitate the type of thinking about technology that challenges routine, questions their approach to teaching and pedagogy, and offers iterative improvement. The TPACK framework provides a resource to help teachers reflect on how to balance technology in their classroom.

In this study, TPACK is examined as a model for professional development as well as a framework to help teachers think about technology in their classrooms. According to Mishra and Koehler (2006), the basis of the framework is “the understanding that teaching is a highly complex activity that draws on many kinds of knowledge” (p. 1020). The framework considers the need to think of technology, pedagogy, and content knowledge similarly when planning learning activities. TPACK can be used as a model to help teachers think about technology in new ways and to consider how technology fits into their teaching practice. The TPACK framework serves as a reference for teachers to begin to consider how to use technology in their classroom but goes beyond that as it offers a model of continuous improvement that they can use while reflecting on how technology, pedagogy, and knowledge fit together and how that “fit” changes as teaching practice evolves. TPACK can serve as a backdrop in

professional development activities that will hopefully lead to the implementation and integration of more meaningful uses of technology.

Lastly, this study will consider how a teachers' belief system influences the implementation of technology in the classroom. The literature states that despite the fact that teachers have had successful experiences with professional development and feel confident with the use of technology, many still elect not to use it in the classroom (Abbitt 2011; Ertmer 2005; Lawless & Pellegrino 2007; Watson 2001). According to Ertmer and Ottenbreit, (2010), even though teachers may agree that technology helps them become more efficient both personally and professionally, low-level uses are still most common in the classroom for a variety of reasons, including lack of relevant knowledge (Lawless & Pellegrino, 2007), low self-efficacy (Mueller, Wood, Willoughby, Ross & Specht, 2008), and existing belief systems (Ertmer, 2005; Hew & Brush, 2007; Subramaniam, 2007). This study examines how the attitudes and beliefs of teachers toward technology and their perceived TPACK emerge through participation in the MAGE Summer Institute.

Methods

This dissertation presents the research study I conducted which utilized a case study methodology to examine how a professional development experience influences the use of technology among social studies teachers. A multiple case study methodology (Merriam, 2009; Yin, 2014) was selected for this research because it aligned most closely with my research goal of understanding how technology self-efficacy and TPACK might be related through detailed examination of select teachers experiences and the factors that

shape their decisions to use technology in the classroom. Qualitative case study research is useful for reaching a deeper level of understanding, “Qualitative case studies share with other forms of qualitative research the search for meaning and understanding, the research as the primary instrument for data collection and analysis, an inductive investigative strategy, and the end product being richly descriptive” (Merriam, 2009, p. 39). Case study research is useful when addressing “how” and “why” questions (Merriam, 2009; Yin, 2014). This research method is applicable in the study of contemporary phenomenon especially when the boundaries between the phenomenon and the context are not clearly evident (Yin, 2014). In this study the phenomenon is the use of technology and the context is instruction in the social studies classroom. I was curious to learn how teachers come to know technology and why certain teachers choose to use technology in the classroom. I wanted to know what makes these teachers “tick” in hopes of helping struggling or reluctant teachers overcome challenges and realize the benefits of using technology in the classroom.

Merriam (2009) suggests multi-case research is used when the researcher collects and analyzes data from several cases. According to Yin (2014) multiple-case studies can “offer analytic benefits, especially if the cases were selected because they offered contrasting situations” (p.64). In this study three cases were selected. As Stake (2006) explains, “In multi-case study research, the single case is of interest because it belongs to a particular collection of cases. The individual cases share a common characteristic or condition” (p. 5-6).

The cases selected for this study satisfied both Yin’s (2014) criteria for offering contrast and Stake’s (2006) contention that the cases share a common characteristic or

condition. The individuals differed from one another in that each represented a different educational setting. Pseudonyms were assigned to conceal the identity of the participants. “Paul” taught in a small rural setting with limited resources. In contrast, “Elliot” taught at an urban technology magnet school, while “Mark” was employed in a suburban midsize school with plentiful resources. The teachers selected as a case for this research shared several common characteristics. All teachers were employed as full-time social studies educators in a public-school system at the time of the study. All of the teachers participated in the activities associated with the MAGE Summer Institute. Finally, these teachers demonstrated a positive attitude toward technology and presented self-reported evidence that they used technology in the classroom. Their use of technology was further identified through their responses to focus group responses, and personal interviews. All of the data collected throughout this study will be covered in more detail in Chapter four. The case study research design offered a richer understanding of teachers’ knowledge of technology paired with their feelings about technology. Abbitt (2011) contends the measure of knowledge and beliefs *separately* can provide unique, informative insights into the preparation of teachers to use technology in the classroom, but examining the relationship *between* knowledge about technology integration and self-efficacy beliefs can provide a unique connection between these two areas of research.

The qualitative data collected during focus groups offered a deeper understanding of the attitudes, barriers, and concerns teachers possess about their use of technology. The focus group discussions also sought to understand teachers’ current view of technology in the classroom based on prior experiences. This information proved useful in

understanding the perspective of the teachers and may influence the way in which professional development activities can be tailored to best meet the needs of teachers and positively impact the use of geospatial technologies.

Overview of the Dissertation

In the following chapters I will present the case study research I conducted to better understand how social studies teachers' self-efficacy beliefs about technology and their development of TPACK influence their use of technology in the classroom. In Chapter 2, I present a review of the research relevant to this study. More specifically, the review of the literature will focus on four areas; teacher professional development, technology in social studies education, TPACK framework and finally teacher technology efficacy. Yin (2014) reminds us that "the purpose of the literature review is not to arrive at the answers about what is known on a topic but rather develop sharper and more insightful questions about the topic" (p. 15). With that definition in mind I sought to understand technology use in the social studies classroom, the use of TPACK as a framework for professional development and the impact, if any, of efficacy on TPACK and technology implementation. In Chapter 3, I describe the case study methodology employed in this study and the data collection procedures. Chapter 4 is a presentation of the narrative generated by examining multiple sources of data. In conclusion, Chapter 5 is a presentation of the findings including a description of how this study could positively impact teacher technology professional development initiatives, the limitations inherent in this study and recommendations for further research.

Chapter 2

REVIEW OF THE LITERATURE

Background and Key Constructs

This study sought to understand why some teachers chose to use and even embrace the use of technology in their classroom, even though it involves overcoming obstacles and barriers while other teachers elect not to use technology or use it only for low level tasks. More specifically, this study was conducted to better understand how social studies teachers' self-efficacy beliefs about technology and their development of technological, pedagogical, content knowledge (TPACK) influence their use of technology in the classroom.

The main point of this paper is to better understand the factors that influence the decisions teachers make regarding the use of technology in the classroom. The main purpose of this study is to analyze participants' development of TPACK and the influence of self-efficacy on technology integration. The review of the literature will focus on three areas. The first section will review the current status of technology use in geography education. The second section will review teacher beliefs and experiences as factors that influence the use of technology in the classroom. Finally, the third section will review TPACK as a framework for professional development.

Geospatial Technology use in Geography Education

Social studies education has received a lot of attention surrounding the use of technology in the classroom. As a discipline, social studies is often criticized for not capitalizing on the affordances of the internet and more specifically Geospatial

technologies (Kerr, 2016, Langran & Baker 2016, Rubino-Hare, Whitworth, Bloom, Claesgens, Fredrickson, Henderson-Dahms & Sample 2016, Schell, 2014). According to Langran & Baker (2016), “Geospatial technologies typically include geographic information systems (GIS), global positioning systems (GPS), remote sensing, image analysis, and related location-based technologies” (para. 2). Kerr (2016) defines geospatial technologies as, “...a set of tools that include dynamic and interactive maps and globes, remotely sensed imagery, geolocation devices, and the information systems that power these technologies” (para. 2). Geospatial technologies provide educators with tools that can help students develop a deeper understanding of their place in the world. “Information that is oriented to time and space provides opportunities to explore the complexity and interconnectedness of economic, political, social, or ecological relationships” (Langran & Baker, para. 2). Further, “Engaging students in developing geospatial literacy helps them understand how location affects perspectives, power, and the environment” (Langran & Baker, para. 3). The use of geospatial technologies to promote geospatial literacy aligns with the definition of social studies education as stated by the National Social Studies Standards (NCSS). According to NCSS, “The aim of social studies is the promotion of civic competence: the knowledge, intellectual processes, and democratic dispositions required of students to be active and engaged in participants in public life” (para. 1).

Advocates for technology realize that these tools of technology can literally transform the classroom. Beck and Eno (2012) convey “there is a body of literature that details how technology could be used with the social studies content area to increase the use of higher order thinking skills, promote historical literacy, and give students the

autonomy to make their own meaning from social studies content” (p. 73). These tools create the opportunity to generate experiences for students that will help them develop into socially competent citizens. Despite seemingly boundless occasions to use technology to improve and expand instruction in geography education, many teachers continue to choose more traditional teaching methods dependent on a text book and direct instruction. “Although technology has the potential to revolutionize social studies education, that potential has not yet been realized in most classrooms” (Beck & Eno, 2012, p. 73). Research states that many geography teachers enter the classroom lacking a rich understanding of geography concepts and how to teach them (Schell & Mohan, 2013). According to Doering, Scharber, Miller, and Velesianos (2009), “Today, social studies teaching and learning is still dominated by traditional pedagogical practices that are primarily teacher-centered, with technology, for the most part, still not being used in transformative ways, if at all” (p. 319).

A look into the history of social studies education may help explain why methods of traditional pedagogy prevail despite the abundance of available technology. According to Beck & Eno (2012), “Controversy is the cornerstone of social studies education” (p.70). Wineburg (2010) claims scholars disagree about what should be taught, how it should be taught, and why it should be taught. The National Council of the Social Studies (NCSS) offers standards to establish what should be taught and why it should be taught. The NCSS offers guidance to aid in curriculum design and student performance expectations. The standards are written to address the ten themes of social studies and are intended to serve as a framework for curriculum planning in grades pre-K12. A teacher in social studies is trained to teach a variety of subjects including civics,

economics, geography, government, and history. Geography is one of the themes categorized under the subject of social studies.

The void of technology in geography education has gained national attention. The Road Map for the 21st Century Geography Education project is a collaborative effort between the National Geographic Society, the Association of American Geographers, the National Council for Geography Education and the American Geographical Society. These groups assembled to achieve the shared goal of creating research-based recommendations and guidelines to support the key knowledge, practices, and dispositions that students and educators must possess, in addition to strategies for supporting the professional development of educators, and the design and evaluation of engaging and effective instructional materials in geography (Schell, Roth & Mohan, 2013, p. 7). The committee sought to, "...replace the stereotypical view of geography as fact-based and descriptive with a balanced and integrated view of geography that recognizes the importance of learning place names, location, and terminology that have historically characterized geography education, along with understanding powerful geographic concepts, and being able to reason geographically" (Schell, 2014, p. 3). The committee emphasizes the notion that, "inquiry-based learning experiences can better integrate 'thinking geographically' and 'doing geography' in order to help students develop the practices of geography" (Schell, 2014, p. 3).

No shortage of guidelines surround geography education. It is recognized as a core subject under No Child Left Behind; revised standards were published in Geography for Life, Second Edition in 2012; The College, Career and Civic Life (C3) Framework for Social Studies State Standards named geography as a core disciplinary concept; the

Partnership for 21st Century Skills Framework includes Global Awareness and Environmental Literacy as 21st Century Themes; and the National Assessment of Educational Progress (NAEP) assess 8th grade students in geography (Schell, 2014). “Simply put, if our children are not taught to think geographically, their success and the success of our nation and the world in the 21st century are in jeopardy” (Schell et al, 2013). More recently a research agenda was proposed by stakeholders in geography education to include the following four focus points: connections between GST and geospatial thinking; learning GST; professional development with GST; and curriculum and student learning through GST (Baker, Battersby, Bednarz, Bodzin, Kolvoord, Moore, Sinton, & Uttal, 2015). The existing guidelines that frame geography education serve as evidence that the subject has gained attention and further substantiates the importance of the subject.

The question of how social studies should be taught continues to be debated by scholars and practitioners in the field. Beck and Eno (2012) contend, “Not only is there a lack of coherent pedagogy among social studies faculty, there are also varied approaches to pedagogy and technology integration in education departments where pre-service, K-12 social studies teachers are trained in the art of instruction” (p.75). According to the literature, professionals at the graduate or upper-undergraduate levels of social studies education are trained in the use of historical inquiry while professors at the undergraduate level prefer traditional methods of instruction reliant on lectures and textbooks (Sipress & Voelker, 2009). “Due to the varied use of pedagogy among higher education faculty, preservice social studies teachers are likely to experience a number of courses that rely on direct- instruction pedagogical strategies” (Beck & Eno, 2012, p.74). Pre-service

teachers who have been trained in historical inquiry may still lack the skill necessary to transfer that pedagogical style to the K-12 classroom and revert to using traditional direct- instructional methods instead (Misco & Patterson, 2009). This has important implications for social studies education because according to Beck & Eno (2012), “It seems likely that direct instruction in higher education courses plays a significant role in influencing pedagogical choices among K-12 social studies teachers” (p. 74). It should be noted that technology can benefit both direct instruction and student centered instruction and that pedagogical styles are intertwined among educators (Beck & Eno, 2012). Several definitions of technology integration are available in the literature which usually include the use of computing devices for instruction (Hew & Brush, 2007). The definition of technology integration that will be used in this paper is offered by Hew & Brush: “...the use of computing devices such as desktop computers, laptops, handheld computers, software, or Internet in K-12 schools for instructional purposes” (2007, p. 225).

In further consideration of the question regarding how social studies should be taught, it is important to understand the signature pedagogies that frame social studies education. Signature pedagogies are defined by Shulman as “the types of teaching that organize the fundamental ways in which future practitioners are educated for their new professions” (Shulman, 2005, p. 52). In social studies education two pedagogical paths emerge. Beck and Eno (2012) organize the signature pedagogies for social studies education into two categories: mainstream signature pedagogy reliant on direct instruction and emergent signature pedagogy dependent on student-centered, inquiry based instruction. Understanding how teachers were taught will lead to a better

understanding about the instructional choices they make when they enter the classroom. “Pre-service teacher training does have a significant impact on later pedagogical and technological practices” (Bai & Ertmer, 2008). Nonetheless, teachers enter the classroom with the opportunity to make decisions about how they will teach, and there are reasons why teachers elect to use particular pedagogies. According to Beck and Eno (2012) educators feel comfortable with direct instruction because, “It leads to subject matter coverage, highly teacher-controlled learning environments, and short-term memorization of facts” (p. 84). Further, Beck & Eno contend direct instruction is appealing to many because of known constraints such as class size, limited resources, the pressure of standardized tests, and the lack of knowledge required to implement student-centered strategies (2012). Student-centered inquiry based instruction leads to a more authentic understanding of social studies but is often viewed as the riskier option because it requires the development of innovative practice (Beck & Eno, 2012). The tension is clearly articulated in the literature. Direct-instruction remains the pedagogical choice among many social studies educators. Yet, the use of technology paired with student-centered instruction affords a greater opportunity to access the content and resources to engage authentically with materials thus allowing for the personalized construction of meaning that ultimately leads to competent, engaged citizens which is the goal of social studies education (Beck & Eno, 2012).

Evidence appears in the literature to indicate the use of technology in the geography classroom is evolving. According to Langran and Baker (2016) the ability to access content and functionality of GIS tools through a browser has increased dramatically in the past three years making it easier for students and teachers to access

content and understand it at a basic level which has afforded instructional designers the opportunity to focus on teaching with technology rather than teaching about technology. Further, according to Baker et al, (2015), “New tools such as online and mobile GIS platforms have eased the use of technology for students and teachers, while online resources have also enabled and facilitated collaborative and multidisciplinary research itself, whether it is to help diverse scholars communicate or make it easier to find and access their published research” (p. 126).

Although the literature on the applications of geospatial technologies is limited, there are certain examples of technology use that exemplifies that which is possible. For example, as an educator of social studies teachers Kerr (2016) believes assignments involving geospatial technologies are relevant across disciplines because it helps educators “to see, think about, represent, and understand the world in new ways is an essential function of education that geospatial technologies can aid in prompting and promoting” (p. 6) and created inquiry based opportunities for teacher candidates to learn about photomissions, ArcGIS Online, and the Census Data Mapper. Additionally, Rubino-Hare, Whitworth, Bloom, Claesgens, Fredrickson, Henderson-Dahms, & Sample (2016) report positive outcomes related to social studies professional development that combined geospatial technologies and project based instruction.

The Influence of Beliefs and Technology Self-efficacy on Teachers use of Technology

A mirage of factors impact teachers’ instructional decisions. “In general when teachers are asked to use technology to facilitate learning, some degree of change is required along any or all of the following dimensions: (a) beliefs, attitudes, or

pedagogical ideologies; (b) content knowledge; (c) pedagogical knowledge of instructional practices, strategies, methods, or approaches; and (d) novel or altered instructional resources, technology or materials (Fullan & Stigelbauer, 1991). Despite the fact that teachers have had successful experiences with professional development and feel confident with the use of technology, many still elect not to use it in the classroom (Abbitt 2011, Ertmer 2005, Lawless & Pellegrino 2007, & Watson, 2001). According to Ertmer & Ottenbreit (2010), even though teachers may agree that technology helps them become more efficient both personally and professionally, low level uses are still common in the classroom for a variety of reasons including lack of relevant knowledge (Lawless & Pellegrino, 2007), low self-efficacy (Mueller, Wood, Willoughby, Ross, & Specht 2008), and existing belief systems (Ertmer, 2005, Hew & Brush, 2007 & Subramaniam, 2007). Levin and Wadmany (2006) found that teachers who use linear, authoritative, teacher-centered methods disregard computers and resist efforts to move the dominant paradigm away from teacher-centered teaching to a more student-centered classroom, and those who embrace a more student-centered constructivist style are more successful at technology integration.

Contemporary theorists and researchers have been instrumental in establishing instructional practices that afford meaningful uses of technology in the classroom. This evolution of understanding has been derived from both objectivism and constructivism. Jonassen (1991) describes the shift that occurred beginning in the 1950s when learning theory went through what he describes as a “scientific revolution” in which models of learning began to draw more heavily on the cognitive sciences than the behavioral theories that preceded them. Epistemically, objectivism assumes everyone gains the

same understanding while constructivism contends meaning is a function of how the individual creates meaning from experience (Jonassen, 1991). Social cognitive theory grounded in behaviorism and pioneered by Albert Bandura “examines the processes involved as people learn from observing others and gradually acquire control over their own behavior” (Eggen & Kauchak, 2004, p. 215). Self-efficacy is classified by Pajares (1992) as a “self-belief” the “cornerstone of social cognitive theory” (p. 308). Pajares refers to beliefs in educational research as a “messy construct” because beliefs are studied in a variety of fields, in different contexts, and the meaning of beliefs changes according to the agenda (1992).

The construct of educational beliefs is itself broad and encompassing. For purposes of research, it is diffuse and ungainly, too difficult to operationalize, too context free. Therefore, as with more general beliefs, educational beliefs about are required-beliefs about confidence to affect students’ performance (teacher efficacy), about the nature of knowledge (epistemological beliefs), about causes of teachers’ or students’ performance (attributions, locus of control, motivation, writing apprehensions, math anxiety), about perceptions of self and feelings of self-worth (self-concept, self-esteem), about confidence to perform specific tasks (self-efficacy). (Pajares, 1992, p. 316).

A persons’ beliefs about their self-efficacy can be developed by four main sources of influence: mastery, vicarious experiences, social persuasion, and reducing stress reactions (Bandura, 1994). Success builds efficacy, and failure diminishes efficacy.

Inquiries into teacher practice should include a parallel investigation into teachers’ educational beliefs because beliefs deeply influence teacher perceptions and judgements which as a result impact classroom behavior (Pajares, 1992). It is therefore necessary to study efficacy together with knowledge developments. Looking at one without the other will not present a clear picture. This is because according to Pajares

(1996), “Knowledge, skill and prior attainments are often poor indicators of subsequent attainments because the beliefs that individuals hold about their abilities and about the outcome of their efforts powerfully influence the ways in which they will behave” (p. 543). Studies attempting to measure self- efficacy have been criticized first because they are typically self-judgements, and second because they tend to be off task or domain specific, so general interpretation or inappropriate definitions of self-efficacy weaken the results of the study (Pajares, 1996). Research is none the less needed because, “Simply stated, a teacher’s perception that he or she can effectively use technology in the process of teaching and learning will impact that teacher’s ability to do so” (Abbitt & Klett, 2007, p. 28). Furthermore, Abbitt & Klett (2007) contend there’s been considerable research conducted examining attitudes of teachers toward computer technology and specifically attitudes influencing basic use of computer technology while little attention has been given to teachers’ attitudes toward using technology in the practice of teaching.

Experiences that Influence Technology use among Teachers

The topic of technology use among teachers is a topic that is prevalent in the literature (Beck & Eno, 2012; Inan & Lowther, 2010; Lawless & Pellegrino, 2007). Much has been written about why and how technology should be used in the classroom (Desimone, 2009; Doering, Koseoglu, Scharber, Henrickson, & Lanegran, 2014) and seemingly even more has been written about why technology still isn’t being used to its full potential (Ertmer, 1999; Hew & Brush, 2007; Kopcha, 2012). One reason for the disconnect between the availability and use of technology in the classroom is the number of barriers teachers face when they try to use technology.

The literature is filled with research surrounding teachers' experience with technology integration. Much has been written about the challenges teachers face while trying to incorporate technology into their classroom (Hew & Brush, 2007; Inan, F.A., & Lowther, D.L., 2010; Kopcha, 2012; Laferriere, T., Hamel, C., & Searson, M., 2013). It is important to acknowledge and understand the obstacles teachers face in order that we may help them move beyond the challenges to realize a more meaningful integration of technology into their teaching practice.

These obstacles are well documented in the literature (Ertmer & Ottenbreit-Leftwich 2010; Hew & Brush, 2007; Kopcha, 2012) and play a significant role in teachers use of technology and therefore merit an explanation. Hew & Brush (2007) identified 123 barriers and classified them into 6 main categories which are as follows: resources, knowledge and skills, institution, attitudes and beliefs, assessment, and subject culture. Ertmer (1999) contends barriers can be delineated into the categories of first order barriers considered extrinsic factors such as resources, time, training, and support while second order barriers are intrinsic and grounded in teachers' fundamental beliefs about teaching and learning. It does seem according to the literature that some barriers have been resolved or at least reduced. For example, the availability of technology was once thought to be a significant barrier to teachers use of technology yet that could be and was resolved by the creative use of resources (Ertmer, 1999). While that demonstrates progress in the right direction, there is still a divide because according to Kopcha (2012), "There is an apparent gap between the amount of technology available in today's classrooms and teachers' use of that technology for instructional purposes" (p. 1109). Findings from a study conducted by Inan & Lowther (2010) indicate that computer

availability directly and indirectly increases teacher technology use, but access alone does not lead to the establishment of technology integration in the classroom.

Research conducted by Inan & Lowther (2010) found that among the factors that influence technology integration include computer availability; overall support from peers, administration and community; teachers' computer proficiency and the factor having the most influence on technology integration was teachers' readiness to integrate technology. According to Inan & Lowther (2010), "Most importantly, teachers' computer and software knowledge helps them figure out the affordances of the technology and how particular software might be beneficial to student learning" (p. 149). Further, Kopcha (2012) contends, "Equipping teachers with the skills and attitudes needed to negotiate the barriers is an important step toward improving their use of technology for learning" (p. 1110).

The literature cites professional development as both a barrier to technology integration (Kopcha, 2012) as well as a strategy to be used to overcome the barriers associated with technology integration (Hew & Brush, 2007). When viewed as a barrier, professional development is often criticized for lacking a correlation to actual practice or coming off as too narrowly focused on technical skills without a clear connection to the classroom (Kopcha, 2012). Further, Avalos (2011) contends, "Not every form of professional development, even those with the greatest evidence of positive impact, is of itself relevant to all teachers" (p.10). Conversely, professional development can be an effective strategy for technology integration. A literature review performed by Hew & Brush (2007) reveals that professional development as a strategy for aiding technology integration is effective when it "... (a) focuses on content (e.g., technology knowledge

and skills, technology-supported pedagogy knowledge and (b) gives teachers opportunities for “hands-on” work, and (c) is highly consistent with teachers’ needs” (p. 238). According to Doering et al, (2014), “...implementation of thoughtfully designed, content specific professional development programs and supported guidance in exploring technology integration models may help schools and teachers overcome these realities and barriers” (p. 223).

TPACK as a Model for Professional Development

The technological, pedagogical content knowledge (TPACK) framework is one model that is helping teachers obtain a better understanding of how to integrate technology in their teaching practice (Abbitt, 2011; Doering et al, 2014; Harris, Mishra, Koehler, 2009; Graham, 2011). According to Baran, Chuang, & Thompson (2011), “TPACK (technological pedagogical content knowledge) has emerged as a clear and useful framework for researchers working to understand technology integration in learning and teaching” (p. 370). Technological pedagogical content knowledge (TPACK) provides a theoretical framework for not only thinking about technology integration, but considering the dynamic relationship between technology and teaching which has the potential to change the concept and practice of teacher education (Mishra & Koehler, 2006). The TPACK framework establishes that knowledge about pedagogy, content, and technology is central to good teaching and must be considered not as separate entities, but as the interaction between these three bodies of knowledge as represented by Fig. 1 (Mishra & Koehler, 2006). Research on TPACK continues to take place across the globe further legitimizing TPACK as the premier framework for

educating teachers on how to think systemically with technology, pedagogy, and content knowledge (Baran, Chuang, & Thompson, 2011).

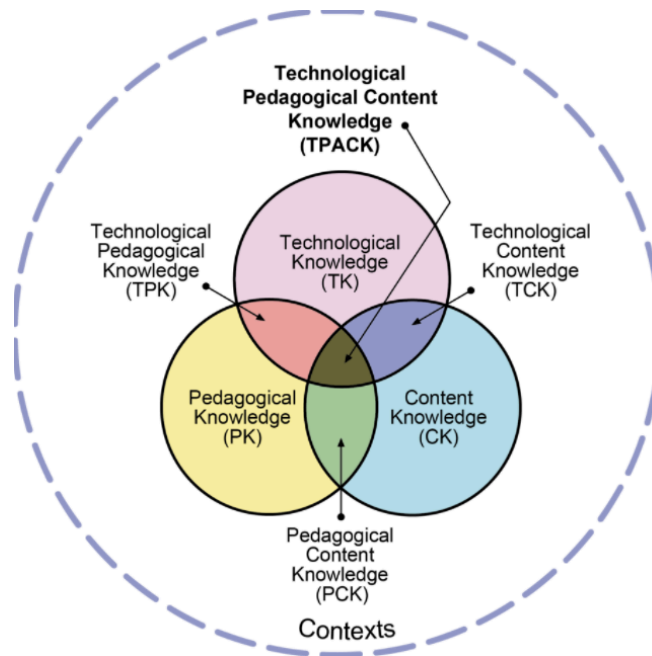


Fig. 1 Graphic representation of technological pedagogical content knowledge (TPACK).

The potential of TPACK as a framework for technology integration was recognized by researchers who realized the need to abandon the concept of teaching technology in isolation and instead realized that situated teacher knowledge is necessary for effective technology integration (Baran, Chuang, & Thompson, 2011). As a framework TPACK informs the practice of technology integration by positioning technology as an integral part of curriculum planning which is a design consideration that is adjacent to content and pedagogy and a necessary component of instruction. The

affordances of the TPACK framework could prove useful to those involved in geography education who are struggling to use technology in meaningful ways. Langran & Baker (2016) contend, “Effectively teaching about geospatial topics requires specific TPACK skill development and pedagogical design capacity that can be promoted through curriculum-linked professional development” (p. 5).

A review of the literature conducted by Voogt, Fisser, Roblin, Tondeur, & van Braak (2013) of articles published on TPACK between 2005- 2011 revealed that from a theoretical perspective TPACK is a complex concept that sparks debate among scholars. “Three different understandings of the concept emerged from the review, T(PCK) as extended PCK, TPCK as a unique and distinct body of knowledge and TP(A)CK as the interplay between three domains of knowledge and their intersections” (p. 119).

Weaknesses are also identified in the use of TPACK. Research conducted by Archambault & Barnett (2010) revealed that TPACK is useful from an organizational perspective, but it is difficult to separate the domains. “The fact that three major factors become evident is noteworthy, but rather than being comprised of pedagogy, content, and technology, the only clear domain that distinguishes itself is that of technology” (Archambault & Barnett, 2010 p. 1659). The theoretical aspects of TPACK are appealing even though it is difficult to measure the constructs (Archambault & Barnett, 2010). This concept is validated by Voogt, et al (2013) who discovered that self-assessment surveys were the most popular instrument used to measure TPACK; while this is useful since they tended to measure self-efficacy, they varied tremendously in the way in which they operationalized the various constructs.

The idea of the TPACK model to help teachers think with technology is evident in the literature. “TPACK explains that teachers are able to make sensible and creative choices in their use of technology in the classrooms” (Baran et al, 2011, p. 370). However, work is still being done to determine how to use TPACK in teacher professional development. According to Doering, Veletsianos, Scharber, & Miller (2009), “...questions remain about how to best implement a TPACK framework in a professional development setting, how to measure TPACK growth, and the impact of teachers’ TPACK on student learning” (p.338). At the same time, professional development aimed at improving teachers’ use of technology needs to move past a focus on the tools and isolated classroom applications (Harris & Hofer, 2011). “Technology-related professional development to date has overemphasized hardware and software affordances, awareness, and skills, giving short shrift to usable, customizable strategies for curriculum-based uses for educational technologies” (Harris & Hofer, 2011, p. 228). The call to improve professional development and evolve the way teachers think about technology creates opportunity to further think about how to use TPACK as a framework for teacher development. According to Kopcha (2012), “The majority of teachers improved their ability to plan and implement technology-infused lessons as a result of extensive modeling, one-on-one planning, and technical support from peers in the community” (p. 1110).

Evidence exists that leaders in the field are working to create researched based professional development opportunities for teachers. A study conducted by Doering et al (2016) studied the experience of geography teachers immersed in professional development focused on developing technological, pedagogical, and content knowledge

(TPACK) using content-specific learning tools and resources. According to Doering et al (2014), “The goal of this professional development program was to immerse teachers in a collaborative learning environment where they could develop technology knowledge and skills concurrently with pedagogical and content knowledge” (p. 223). Other are engaged in similar research. A study conducted by Hong & Stonier (2015) utilized the TPACK framework to design professional development aimed at helping teachers learn how to use GIS in the classroom. “The goal of this training was to educate teachers on how to effectively integrate GIS technologies in their teaching by providing technological (GIS), pedagogical (inquiry-based learning (IBL)), and content (social studies) knowledge” (Hong & Stonier, 2015, p. 109). The research provides useful insight into how TPACK can be used to support teachers in their efforts to better utilize technology in the classroom.

Summary of Literature Review

The research on technology use among geography teachers, teacher beliefs and barriers to technology integration offer important insight regarding the design of a study involving teachers’ development of TPACK during professional development.

This study of the experience of geography teachers in a workshop designed to improve their ability to teach using geospatial technologies builds upon current professional standards and research into the responsibilities, complexities, and challenges facing geography teachers. This study is conducted in response to researchers who suggest, “Modeling and providing instruction in how to use these technologies for analysis and critical thinking is largely still necessary to be geospatially literate, and

sustained research in these areas will help inform best practices” (Langran & Baker, 2016, p. 7).

Social studies education has a rich history of dialogue and debate over what should be taught and how it should be taught. An examination of the literature outlined the signature pedagogies that frame social studies education and established that the two main pedagogical approaches to teaching social studies are direct instruction and student-centered inquiry based instruction. Although they present distinct opportunities, the two are not mutually exclusive and both can benefit from the use of technology (Beck & Eno, 2012).

Teachers are heavily influenced by the teaching models they observed throughout their teacher education programs and enter the classroom with knowledge and beliefs that influence their instructional decisions. The use of technology among teachers varies tremendously from low level use to highly integrated applications. Often, despite their best intentions teachers encounter barriers in their school environment that inhibit their plans to use technology. The barriers to technology integration are well documented in the literature and were explained in this chapter. It is important to understand the challenges and realities surrounding teaching with technology that exist for practicing teachers so that professional development initiatives can be sensitive to the barriers and help teachers identify strategies to overcome obstacles.

Momentum surrounds the design of and subsequent use of ubiquitous technology and the idea that technology is becoming easier to learn, easier to employ, and will lead to better use overall. With that in mind several successful applications of geospatial technologies were highlighted. All of this is foundationally important for the continued

design and development of effective teacher professional development. A study conducted by Kerr (2016) revealed that, “While the vast majority of respondents were not comfortable with using geospatial technologies in their instruction, 33 participants (70%) said they would be interested in learning how to use geospatial technologies pedagogically” (para. 21). This is encouraging information for those involved in the design and delivery of professional development and further substantiates the need for improving the way teachers learn to teach with technology. TPACK informs the practice of technology integration by positioning technology as an integral part of curriculum planning, a design consideration that is adjacent to content and pedagogy. Doering and Veletsianos (2008) contend geography technological pedagogical content knowledge is a necessary component for teacher education programs to place focus in order to facilitate increased integration of geospatial technologies such as Google Earth into K-12 classrooms. The continued adoption of the TPACK model will help teachers think systemically about technology in the curriculum.

The literature clearly identifies the desire of the field of social studies education to work within an established framework to advance the understanding and use of geospatial technologies in the geography classroom (Voogt, et al (2012). TPACK has been identified as a tool for developing effective professional development aimed at improving teachers use of geospatial technologies (Doering, et al, 2014). This study contributes to the call for research as described by Voogt, et al (2012) who suggest that, “...teacher knowledge and beliefs are closely related, we also need further research focused on the complex relationship between TPACK (teacher knowledge), teacher practical knowledge and teacher beliefs” (p. 120). As a result, additional research is needed to further

understand the intersection of teachers' beliefs and advancement of TPACK through the study of professional development and the experiences of teachers that lead to the thoughtful use and integration of technology. This study is intended to contribute to the literature by examining geography teachers' development of TPACK through their involvement in a professional development experience.

CHAPTER 3 METHODOLOGY

In this chapter I begin with a review of the purpose of the study and the research questions. Next, I describe case study research and provide a rationale for selecting this methodology. Finally, I will explain the procedures used in this study, the research setting, participants, data collection, and data analysis.

Restatement of the Purpose and Research Questions

Through this research I sought to more deeply understand the experience of teachers who participated in a professional development workshop designed to improve their ability to teach social studies. Specifically, I was interested to learn what factors contribute to teachers' decision to use technology in the classroom even when it is not required of them and certain barriers exist. The context of this study centered on teacher technology efficacy, as this is a strong indicator of behavior (Moran & Hoy, 2001; Palak & Walls, 2009, Lee & Tsai, 2010) and the TPACK framework because it serves as a backdrop for discussion related to instructional decisions (Lee, M, & Tsai, C. 2007; (Koehler & Mishra, 2009).

The guiding research question in this study sought to examine how participation in an institute emphasizing technology, content, and pedagogy influences a social studies teachers' teaching practice and decision to integrate technology in the classroom. Specifically, this research sought to answer the following questions: (1) How does a TPACK- focused professional development experience focused within the social studies influence the development of technology efficacy and TPACK in social studies teachers?

(2) How do teachers' beliefs about technology efficacy and TPACK influence their use of technology in the classroom? (3) Why do some teachers more readily adopt technology use in the classroom than others? (4) What factors of a TPACK-focused professional development appear to have the strongest effect on teachers' actual integration of technology in the classroom?

Qualitative Case Study Design

A multiple case study methodology (Merriam, 2009; Yin, 2014) was selected for this research because it aligned most closely with my research goal of understanding how participation in an institute emphasizing technology, content, and pedagogy influences the practice of social studies teachers and their decisions to integrate technology in the classroom. "Qualitative case studies share with other forms of qualitative research the search for meaning and understanding, the researcher as the primary instrument for data collection and analysis, an inductive investigative strategy, and the end product being richly descriptive" Merriam, 2009, p. 39). Case study research is useful when addressing "how" and "why" questions (Merriam, 2009; Yin, 2014). This research method is applicable in the study of contemporary phenomenon especially when the boundaries between the phenomenon and the context are not clearly evident (Yin, 2014). In this study the phenomenon is the use of technology and the context is instruction in the social studies classroom. I was curious to learn how teachers come to know technology and why certain teachers choose to use technology in the classroom. I wanted to know what makes these teachers "tick" in hopes of helping struggling or reluctant teachers overcome challenges and realize the benefits of using technology in the classroom.

Multi-case research is used when the researcher collects and analyzes data from several cases (Merriam 2009, p. 49). In this study three cases were selected. According to Yin (2014) multiple-case studies can offer analytic benefits, especially if the cases were selected because they offered contrasting situations (p.64). As Stake (2006) explains, “In multi-case study research, the single case is of interest because it belongs to a particular collection of cases. The individual cases share a common characteristic or condition” (p. 5-6).

The cases selected for this study satisfied both Yin’s (2014) criteria for offering contrast and Stake’s (2006) contention that the cases share a common characteristic or condition. Each case shared the following common characteristics: practicing social studies teacher, participant in MAGE summer institute, positive attitude, and self-reported engagement with technology. In contrast, each case represents a different educational setting: a small, rural school with limited resources, an urban technology magnet school, and a suburban midsize school with plentiful resources. Each of these characteristics will be discussed in more detail later in this chapter. The three cases that make up this study are categorically bound in that all three individuals attended the MAGE workshop. Merriam (2009) describes a case study as, “an in-depth description and analysis of a bounded system” (p. 40). The bounded system is defined by Smith (1978) as the *what*, a single entity, a unit, around which there are boundaries.

Creswell’s definition of case study research best captures the intent, process and outcome of this research. He states, “case study research is a qualitative approach in which the investigator explores a bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of

information (e.g., observations, interviews, audiovisual material, and documents and reports), and reports a case description and case-based themes” (Creswell, 2007, p. 73). This description is representative of the research I conducted. I studied high school teachers who participated in a three-month professional development institute designed to improve their ability to teach social studies. According to Yin (2014) case study research relies on multiple sources of evidence, and the construct validity of the case becomes stronger when multiple sources of evidence measure the same phenomenon. I collected data through the use of focus groups, and personal interviews. Multiple sources of evidence help to ensure that the participant’s position has been accurately described. I adopted a relativist orientation as this is suggested by Yin (2014) as an approach that accepts the possibility of multiple realities derived from participant perspectives. Data was collected from the same participants on multiple occasions which further satisfied Yin’s (2014) definition for “multiple” sources of data. Using this multiple methods approach I was able to identify the common themes among the cases and seek answers to my research questions.

Research Procedure

Setting. The Minnesota Alliance for Geographic Education (MAGE) is a professional organization comprised of a collaborative group of educators who advocate for their members through the promotion of geographic literacy for teachers and students (Minnesota Alliance for Geographic Education, 2010). During the summer the organization offers a summer institute that is causally referred to by members and participants as “MAGE”. For the purposes of this paper, unless otherwise noted, MAGE

will refer specifically to the summer institute and not the name of the professional organization.

The MAGE experience began in late June when participants received their course materials via email, access to the course site, instructions for the weeklong, face-to-face workshop, and the requirements for receiving graduate credit for their participation in the institute.

The weeklong workshop is co-hosted by two institutions of higher education located in the upper mid-west: a private coeducational liberal arts college and a public research university. Both institutions and participating faculty members are affiliated with the Minnesota Alliance for Geographic Education (MAGE). The unique partnership between these two educational institutions and the passion demonstrated by the faculty for geography education, in particular, is largely responsible for the success of MAGE as evidenced by enrollment and the number of teachers who participate year after year.

During the weeklong summer institute, participants spent their time in a classroom environment. The structure of the institute allows learners to interact in a variety of learning experiences. The schedule is carefully planned by the workshop organizers to include a variety of topics, interactive sessions, and lab time to practice using the technology that is showcased during the week. A contextual overview of the professional development is shown in Appendix A. Instructors used their laptop computers and projected instructional materials onto a screen using an LCD projector that was provided in the classroom. All participants brought their own laptop computers and followed along with the instructors as material was presented. I later learned it was

helpful for participants to “bookmark” websites and technology tools that were referenced during instructor presentations so that they could easily remember what was discussed in class but return to the resource when they had more time to explore. The instructors used a class webpage created using the online social platform Ning to keep the daily schedule, post notes, resources, and instructional materials. The Ning environment also offered an online space where participants could connect outside of class during the workshop and in the weeks and months following the institute.

The focus of the institute is to promote teachers’ knowledge of geographic education standards, geotechnologies, and authentic pedagogies with the specific goal of situating teachers in a collaborative learning environment to develop their technology knowledge and skills in conjunction with their pedagogical and content knowledge. During the workshop participants were introduced to the TPACK framework (Mishra & Koehler, 2006) for modeling the use of technology and had the opportunity to learn a variety of technology tools, such as GeoThentic (Doering, Scharber, Miller & Veletsianos, 2009) and Google Earth while considering technology integration in connection with the TPACK framework. Throughout the week technology tools specific to geography education were modeled in authentic applications designed to engage teachers and evolve their understanding of methods and instruction related to geography education. These experiences were designed with the specific intent of increasing teacher understanding of technology for the purpose of improving their understanding of and confidence with technology. The institute affords social studies teachers a rare opportunity to connect with peers from around the Midwest, to engage in learning

opportunities that combine relevant technology to geography standards, and to bring new knowledge and current applications back to their classrooms.

The MAGE institute was designed around the TPACK framework. Research has suggested that using the TPACK framework in professional development offers trainers the opportunity to re-think the knowledge teachers should have (Doering, Veletsianos, Scharber, & Miller, 2009). Doering et al suggest, “Rather than separating knowledge related to three areas, it may be more valuable to transform professional development programs into modern interventions aimed at enhancing the intersection of knowledge domains that guide effective teaching” (2009, p. 334). With that concept in mind the delivery of professional development at the MAGE institute truly brings to life the TPACK framework. Instructors were chosen because of their expertise and ability to model the TPACK framework (see figure 2 workshop experts).

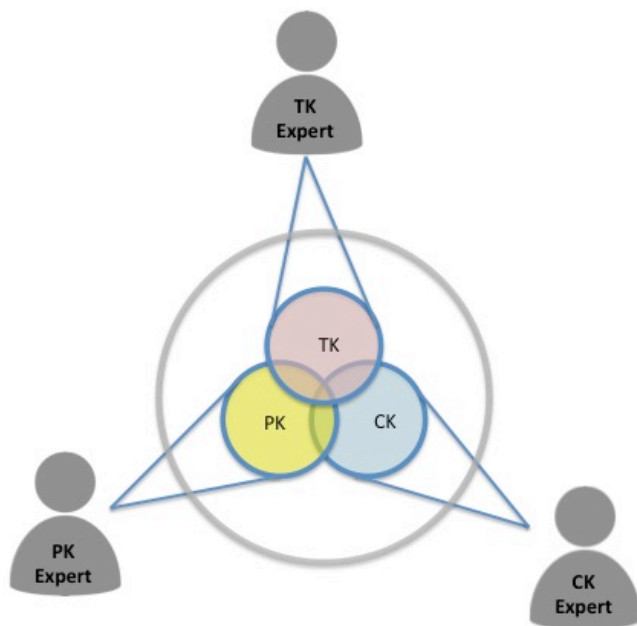


Fig. 2 Workshop experts

In other words, the professor who talked about pedagogy was himself an expert in pedagogy who modeled appropriate pedagogical strategies for use in the social studies classroom. This professor represents the P in the TPACK model. Similarly, the professor who taught technology was himself a technology expert, representing the T in TPACK, and the professor who taught content was a content expert, the C in the TPACK framework. Throughout the week the experts presented material weaving through a variety of pedagogical strategies, content areas within the social studies, and technology tools demonstrating the ongoing pursuit to balance these tenets and deliver meaningful learning experiences.

Following the workshop, teachers seeking graduate credit were required to generate a technology integrated lesson plan and encouraged to apply the lesson in their classroom when school resumed in the fall. Finally, approximately four months after the weeklong workshop, as a final component of the institute, teachers were invited to attend a daylong session in which they presented their technology integration lesson in a Pecha Kucha style presentation. Pecha Kucha TM is a presentation style where 20 images are shown for 20 seconds each while the presenter describes each image. During the day, long sessions teachers were invited to participate in the second and final focus group.

Participants

The participants in this study were high school social studies teachers admitted into the institute during the summer of 2013. These teachers represent 22 public school districts from 2 different states in the Midwest. According to Patton (2002), “the logic and power of purposeful sampling lies in selecting information-rich cases for study in

depth. Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the inquiry, thus the term purposeful sampling” (p. 230). Further, according to Merriam (2009), “To begin purposive sampling, you must first determine what selection criteria are essential in choosing the people or sites to be studied” (p. 77). Therefore, criteria used in selecting this case were as follows: high school social studies teachers admitted to the institute in the summer of 2013, who are currently teaching in the classroom (i.e. substitute teachers or unemployed teachers will be omitted), and who participated in the summer and fall focus groups and a personal interview. This was accomplished by focusing on teachers with a favorable attitude toward technology that voluntarily participated in a 3- month workshop designed to improve their ability to teach geography.

Data Collection

The purpose of this study is to better understand how participation in an institute emphasizing TPACK influences social studies teachers teaching practice and decision to integrate technology in the classroom. A case study methodology was used because it allows the researcher the opportunity to investigate a phenomenon. According to Merriam (2009), “Qualitative case studies share with other forms of qualitative research the search for meaning and understanding, the researcher as the primary instrument of data collection and analysis, an inductive investigative strategy, and the end product being richly descriptive” (p. 39). In consideration of this definition I gathered data using multiple sources. Data for this study was collected in the form of focus group discussion, and telephone interviews. “Data analysis is a complex process that involves moving back

and forth between concrete bits of data and abstract concepts, between inductive and deductive reasoning, between description and interpretation” (Merriam, 2009, p. 176). The specific details surrounding each form of data is described in detail in the following sections.

Focus Groups

Qualitative data was collected through focus groups. “Focus groups can provide insight into complicated topics when opinions are conditional or when the area of concern relates to multifaceted behavior or motivation” (Krueger & Casey, 2000, p. 24). Teachers were invited to participate in a focus group during the weeklong summer institute and again in the fall when they returned for the one-day fall session. Questions were asked to ascertain the teacher’s experience with the workshop, their impressions of the TPACK framework, and feelings toward technology in the classroom.

All members of the institute were invited to participate in a focus group. A sign-up sheet with the option of choosing Wednesday or Thursday was circulated the first day of the institute, and all members were encouraged to participate. In total, seventeen teachers agree to participate. Nine teachers signed up for the Wednesday focus group and eight teachers signed up for the Thursday focus group. Focus groups were held over two days at the end of the weeklong session during lunch break. Those interested in participating could select which day they wanted to join the focus group. In exchange for their time, focus group participants were given a \$10 Target gift card.

Each focus group was conducted in person in a conference room on campus. I used Audacity® which is an easy to use, open source program for recording and editing

audio. Audacity® is simple to install and use and was a program I had used in the past to record interviews, so I was confident it was a good option to use record my focus groups. I connected an external microphone to my laptop during the focus groups to improve the quality of the audio. I tested the equipment prior to the arrival of the participants.

The focus group was held during the lunch hour. Conducting the focus group during lunch was an efficient use of time and did not disrupt any other planned activities. Each focus group session lasted approximately thirty-five minutes. The focus groups were held in a conference room at the university. The room was furnished with a large conference table and office style chairs. Participants could fit comfortably around the table. The room was equipped with a microphone that connected to a laptop, and the session was recorded using Audacity® an open source program used for recording and editing sound. Participants were given a Consent Form to review and sign (see Appendix E). I informed all participants that I would be recording the session and reminded them that participation was voluntary, and they could withdraw from the discussion at any time.

The recorded sessions would later be transcribed, so I did several things to help me identify participants. When the participants entered the room, I asked them to write their name on a piece of paper and fold it in thirds to serve as a name plaque. This allowed me to call them by name during the discussion. Next, I distributed an image of the TPACK framework on a piece of paper and asked them to place a star on the framework to identify where they saw themselves and justify their position in a few written sentences (see Appendix F for more information on the TPACK worksheet). This was done at the beginning of the summer and fall focus groups to see if the teachers

perceived their TPACK had changed as a result of the MAGE experience. As the group completed these tasks, I drew a seating chart identifying each person and indicated where they were seated at the table. I started the discussion by asking participants to introduce themselves. This allowed me to identify their name with their voice on the recording which was useful when I transcribed the session. Questions to guide the discussion were prepared in advance (see Appendix G for more information about the focus group questions).

Semi structured personal interviews

In this study, I elected to conduct personal interviews with select individuals in an attempt to more deeply understand the experience of teachers participating in MAGE as well as their use of technology prior to attending the institute. According to Merriam (2009) interviews are useful when we cannot observe behavior, feelings or how people interpret the world around them and also in cases when we are interested in past events that cannot be replicated. I was interested in understanding the path that led each teacher to attend the MAGE institute and the experiences that shaped their opinions of technology. Merriam contends, “Less structured formats assume that individual respondents define the world in unique ways” (2009, p.90). The semi-structured interview format offered the best option for collecting data since interview questions are a mix of structured and unstructured questions that are flexibly worded (Merriam, 2009).

I selected candidates for the personal interviews from the group of teachers who participated in both the summer and fall focus groups. In total, this produced seven candidates. Six of the seven teachers were employed as full time high school teachers.

One participant was employed as a substitute teacher in three school districts. I eliminated the substitute teacher as a candidate for a personal interview because the nature of her employment did not align with the goals of the research focus. Of the remaining six candidates, I sought to identify who I thought would be best suited for the personal interviews. I made this decision by reviewing the information gathered during the focus groups: personal notes, recorded audio, and transcripts. Four candidates emerged from this group because their stories were interesting, their responses were detailed, and their backgrounds varied from one another. I emailed each candidate to request a personal interview (see Appendix H Interview Request Letter). Each candidate accepted my request, and we worked together to establish a time and date for the interview.

Each personal interview was conducted over the phone. This was the best option for accommodating the schedule of the candidates. On average, the interviews lasted about forty minutes. I recorded the interviews using an application I downloaded on my mobile phone titled Call Recorder. This “ap” works similarly to a three-way call. This worked well because I was able to dial the candidate, introduce myself, and seek consent to record before actually recording the session. Once the candidate agreed to be recorded I connected to Call Recorder and recorded the session. The recording generated a file that was stored on my phone. Additionally, I sent the file to my laptop computer to serve as a back-up. I elected to transcribe the recordings myself. Transcribing allowed me the opportunity to hear the interview multiple times and process the information. The phone interviews were recorded and later transcribed, coded and analyzed for themes.

At the beginning of the interview, teachers were asked questions that were conversational and light to establish a dialogue and put them at ease. For example, I asked

each teacher how the school year was progressing thus far and to list the courses they were currently teaching. Next, I asked them questions about their background and how they came to know technology. Teachers were first asked questions regarding their overall experience with the institution. They were then asked to describe the factors they believe were most influential in advancing their ability to integration technology. Finally, teachers were asked questions about their experiences with technology in the classroom. (interview questions attached appendix I).

Data Analysis

Qualitative Data

I reviewed two methods of data analysis to determine which one would be the best choice for leading me as novice researcher through the process of analyzing data. The first method involved Dedoose® a powerful software program that analyzes qualitative and mixed methods data. The learning curve for understanding the software was steep, requiring me to spend several days learning the software, creating categories and codes, and entering data. As a new researcher lacking proficiency with coding data, I began to get lost in the software and felt as though I was spending more time learning the software than I was analyzing the data. I revisited Krueger and Casey (2000) and was validated by the suggestion that “beginning analysts use the long table approach”. Described by Krueger as a “low technology, time-tested approach that lacks sophistication” the long table method allowed me to more easily manage my data through a visual, manual means that permitted me to better identify themes and categories. Thus, the long-table approach

presented by Krueger & Casey (2000) was used as a basic approach to organizing data. This approach involved spreading out all transcribed data on a long table, cutting transcripts according to theme, and arranging them on a table while identifying and categorizing similar items until all units of transcripts have been considered.

In total, I had seven transcripts to analyze: two summer focus groups, one fall focus group, and four personal interviews. I elected to transcribe the data myself rather than hire a professional. I transcribed each audio recording using a word processing program as soon after the meeting as possible. In this way, the voices, comments, emotions, and intent of what was being said was still fresh in my memory. Each line of every transcript was identified with a line number that was easily added using a word processing program. Transcripts were each coded with a unique color for easy identification. This was done by drawing a line down the center of each page with a colored marker. This allowed me to identify which transcript the quote belonged to during the data analysis phase. I labeled each personal interview with the letter “I” to indicate “interview” and a number for reference. Similarly, each focus group transcript was labeled with an “F” for focus group and a number for reference.

Merriam (2009) recommends the constant comparative method proposed (as cited in Glaser and Strauss, 1967) to analyze qualitative data. Microanalysis, defined by Strauss and Corbin (1998) as “the detailed line-by-line analysis necessary at the beginning of a study to generate initial categories” (p. 57) was used to identify initial categories. Next, axial coding was employed to further analyze the data. Axial coding is, “the process of relating categories to their subcategories, termed “axial” because coding occurs around the

axis of the category, linking categories of the level of properties and dimensions” (Strauss & Corbin, 1998, p. 123).

Data collected through observation, interviews, and focus groups will be triangulated to reach a deeper understanding of teacher technology efficacy and teacher TPACK. Greene, Caracelli, and Graham (as cited in Creswell & Clark, 2011) define triangulation as seeking convergence, corroboration, and correspondence of results from different methods.

CHAPTER 4

FINDINGS

The Findings from Paul's Case

Description of Paul: Novice Teacher, Limited Technology Experience, Rural Setting

Paul is a male social studies teacher in his late 20s who just completed his second year of teaching at a remote rural high school in the upper Midwest. Throughout the interview Paul was quiet, reserved and thoughtful in his responses. When asked how his school year was going Paul said, "Ah, well, it's been difficult" (I#1). At the time of the study, Paul was attending the MAGE summer institute for the second time. He was teaching five different classes including 9th grade government, 10th grade human geography, psychology, and world history. Two of the courses he had never taught before and the others he described as somewhat new because he overhauls his curriculum every year.

Paul's experience with technology.

Paul did not have any formal technology instruction during his college education. Paul refers to his technology experience as non-existent when he entered the classroom as a new teacher.

I didn't have any experience with technology and I definitely wouldn't think of myself as a technological person, I used to have friends that would make fun of me because I didn't even have a smart phone when I started teaching and I had no plans to become one (I#1).

Paul considers the school where he teaches to be behind in terms of technology integration. Even though the school has resources the equipment is not utilized.

We have actual resources we have computer labs available, we have mobile labs available with laptops but people don't utilize them, teachers don't utilize them

certainly not, they sit idle most of the time and as far as cutting edge things its almost non- existent like flipping classrooms and stuff like that (I#1).

Paul cites two main reasons for the lack of technology use in the school; the age of his colleagues and the lack of incentive from school leadership.

We have an older staff and they haven't taken the initiative to do something new and you know it's a lot of work and kind of scary to do something new plus there's not really a push for it at the top level so it's not being demanded of them by leadership so there's no push for them to do it whatsoever (I#1).

Paul strives to use technology in all his classes although he admits he'd like to do more. "I don't think I've used as much as it needs to be used, there's so much more to learn and get perfect but I'm going to get into it a lot more" (I#1). Specifically, he likes to use ubiquitous tools such as Google Forms, Google Docs, and Poll Everywhere and is also using Schoology. Computers and internet access are available at the school where Paul teaches, however student access to technology at home is very limited. Paul described technology access among his students as follows,

In conversations with other teachers and my own personal surveys that I have taken its somewhere between 80%-100% of students that don't have access [at home] and it ends up being a big issue so that is why if we went one to one they could take it home, but if we give them iPads but they don't have internet at home there is really nothing they can do to get content, even if they have the device, it's a problem (I#1).

Research question 1: How does a TPACK- focused professional development experience focused within the social studies influence the development of technology efficacy and TPACK in social studies teachers?

As a new teacher, Paul feels he has much to learn about content, pedagogy and technology. His experience with this professional development experience could be considered foundational. Even though technology is available in his building he does not feel adequately supported in his efforts to learn technology. While he did credit his

school for sending him to the TIES conference one year, he sought out MAGE on his own. “I looked into it and saw that it gave me grad credits and things and I figured if it’s free grad credits why not, I want to get better so I went and I’m really, really glad I did” (I#1).

Paul’s experience with MAGE served as a gateway to a better understanding of technology. During the first focus group discussion that took place in the summer, Paul was quiet and did not contribute as much as some of the other participants in the group. In fact, excluding introductions he responded to only one question. His response to that question, however was interesting and served as perspective to understanding Paul. There was an exchange between Paul and another teacher that highlighted Paul’s development.

“You know, I think about where I started in my first year and I was completely hopeless at technology and through effort I think I’ve come a super, super long way, and I feel so differently about it now than I did two years ago, just 100% differently” (F#1).

In response to Paul, another teacher in the group had this to say, “Even just talking to you from last year, your presence, your comfort is different, I mean I can see it!” (F#1). Paul’s comfort talking about technology increased with time. During the second focus group that took place in the fall Paul quickly responded to the first question and continued to participate throughout the focus group session. Regarding his experience with technology integration since the summer workshop Paul shared the following,

Experimentation. Implementation is an issue there’s a sense for me- I’m not sure if it’s like this for everyone, that it’s practice for when it’s going to be perfect. It never feels like ‘oh yeah this is how my class is going to look, this is my class!’ It’s more like my class will be some way in the future in some indeterminate

moment let's work on this and experiment with that and we can figure out what that final formula is" (F#3).

Strengths and weaknesses of TPACK. Prior to his attendance at the MAGE Institute

Paul had never heard of TPACK.

I hadn't seen it before and I think it's just a good way to keep track of your own growth and to kind of quantify your growth and to compartmentalize your growth and to think about it is useful in that sense, I think (I#1).

Even though Paul did not know about the TPACK framework he did believe his approach to instruction was balanced between content, pedagogy and technology. Paul felt that the TPACK framework was a tool that was useful when reflecting on his teaching practice.

I think it's a good reflective tool and it's only good if you reflect, if you take time to reflect and so if you have a teacher and you are going to spend some of your time reflecting with that teacher on your growth I think it's a good framework to do that type of thing day to day. I don't think about it day to day, I don't think where am I on TPACK today on Tuesday or Wednesday I don't think about it that way when I'm taking time to reflect, sure it's very useful (I#1).

It was evident that Paul did spend time using TPACK to reflect on his own practice. Paul shared that he felt he had moved toward the center of the model as far as technology was concerned but had this to say about pedagogy,

Pedagogy is kind of misleading because pedagogy has changed the learning completely, new pedagogies in technology changes what pedagogy is, it's not about old pedagogies, it's about it's about completely new pedagogies so you have to reframe that whole part of it, it might not be about all summative assessments anymore it might be more problems based learning now and that means you need to re-think where you are on pedagogy because now your goals are different and the whole concept of pedagogy is different. In that sense, I'm getting closer to the center with the new pedagogy with the whatever you want to call it 21st century pedagogy. Knowing what it is now means I'm closer to the center" (I#1).

During the fall focus group the participants were asked once again to share their feelings toward TPACK. This time, Paul felt the model would be a useful tool to engage his colleagues and learn where they would place themselves in the framework. “I think it helps them reflect on how they fit and I think it would be interesting to see how your colleagues see they fit in the model” (F#3).

Paul was asked during each focus group to indicate his position in the TPACK framework and justify his position. His results are shown below in Figure 3.

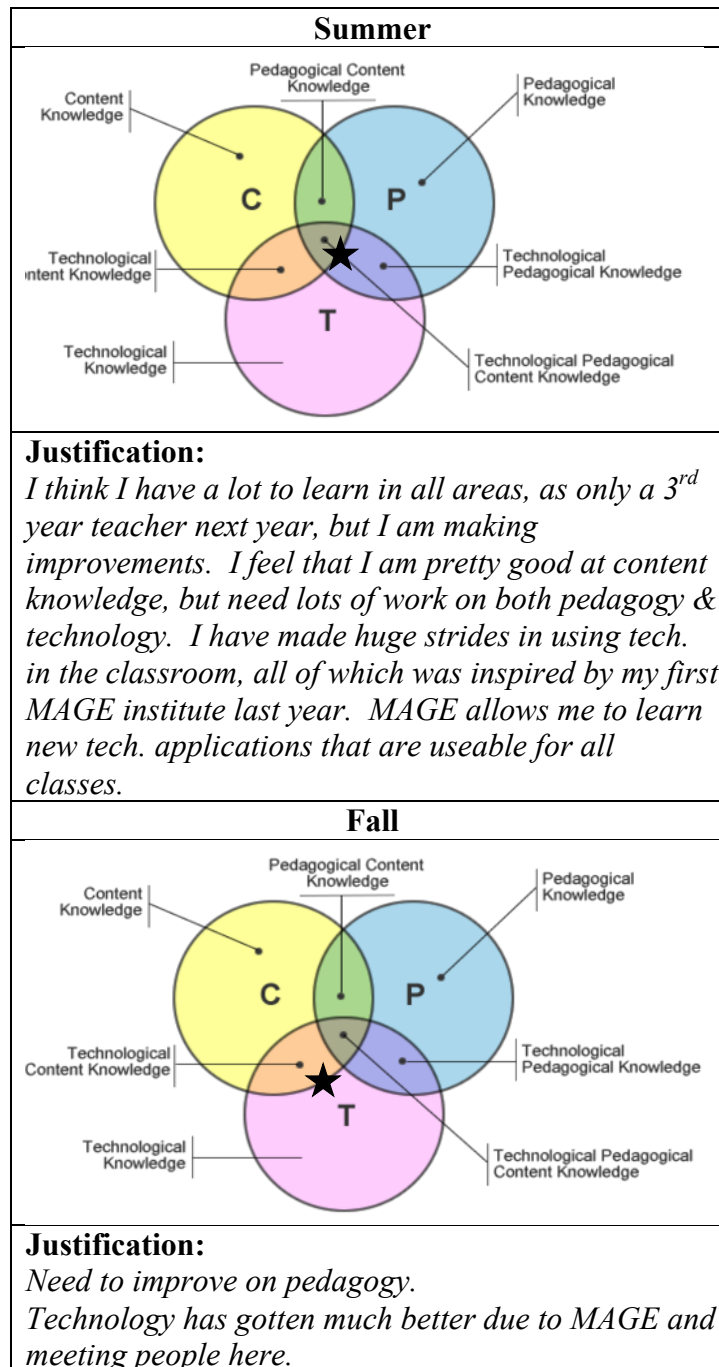


Fig. 3 Paul's TPACK

Research question 2: How do teachers' beliefs about technology efficacy and TPACK influence their use of technology in the classroom?

Paul described his experience of returning to the classroom with new knowledge and ideas he had gained from participation in the MAGE Institute. Specifically, he described what it was like to return to the classroom excited to try new applications of technology.

Well you know, I mean you are excited about it and I think I was pretty realistic with my expectations and I didn't think it was going to work perfectly for me the first time and I had technology backfire on me before and I know it's part of it, it's just part of trying it you know, it's a process and sometimes you're going to take steps backwards and sometimes things aren't going to work like you want them to work and I was pretty cognizant of that so I don't know, my first couple of tries were pretty easy things actually and they worked pretty good I guess (I#1).

He believed that the MAGE Institute offered him a solid foundation for adding technology into his teaching practice. Further, he was aware of the pitfalls associated with the use of technology in the classroom and mindful of the idea that things do not always go as planned.

At first I'm only in my third year of teaching here so at first I had a backup plan for everything but now with this year and everything if something doesn't go as planned I can pretty much on the fly come up with something that's relevant that's going to work ok that's different, you know what I mean? I don't necessarily need to plan a specific backup plan I can figure something out. You know when you start to have an array of different technology tools you can use if one doesn't work you can usually find something else similar with technology or without (I#1).

Paul's attitude toward technology is flexible and realistic. He is new to teaching and teaching with technology, his learning curve is steep, and grounded in the notion that he believes technology is an essential component of his instruction. He accepts setbacks as a necessary progression in his development.

If it doesn't go quite right I guess I don't blame the tool, I'm certainly not ah, I'm not going to shy away from using it because it didn't go right once. Usually, when it doesn't go well once it's my fault not the tool, I haven't thought things through enough or how I should use it yet and that's the way I always think about it (I#1).

Throughout the interview, as Paul reflected on his teaching practice, he consistently described a strong sense of personal responsibility toward learning technology and using it effectively in his courses. He admitted that there was not a lot of support from the leadership in his building to use technology and yet that did not deter his efforts. "They don't support me and I don't feel really bad about that because I do sort of think that if you are going to make it work you have to do it, you have to make it work" (I#1). Paul's attitude toward technology is grounded in his own beliefs about teaching. He is not reliant on others for his success nor is he being incentivized to pursue technology integration. He wants to do a good job and feels responsible to his students to ensure they receive the best education he can provide. Paul admits he doesn't use as much technology as he'd like to and he'd like to get to a point where he is using technology every day, all day with the ultimate goal of having a flipped classroom.

I'd like to have a flipped classroom in every class. I'd like to use technology on everything all the time because I think it's just a reality of the future. Occasionally, we might sprinkle in some old-school things sort of like most teachers sprinkle in technology. Now I think it's the complete reversal. I just think it's like I feel that it is just a fact of life that is the direction it's going; you're going to get in the front end of it or you're going to be behind and I don't want to be behind (I#1).

Paul admits he spends a great deal of time outside of the classroom, in the evenings and during the summer, working on technology. "It's a huge investment of time and you know it's one that theoretically will pay off down the line" (I#1). Personal reflection is a strong component of Paul's evolution. "I think I can visualize what kind of teacher I

want to be, I can see it in my minds' eye, but I am just not there, it will take a while” (I#1).

Research question 3: Why do some teachers more readily adopt technology use in the classroom than others?

Throughout Paul's interview and focus group participation his demeanor was reserved and his responses were thoughtful. At the MAGE Institute when compared to the other teachers in the focus group Paul had the least amount of teaching experience. He stated his teaching goal in very basic terms, “I want the kids to learn the most” (I#1). The perseverance Paul displayed stemmed more from intrinsic motivation than external rewards.

I think they are, at least in my district, I think they understand that I'm doing this stuff, there doesn't seem to be an effort to spread the word or to have a vision for everyone or anything like that but I think that they think it's good, that I'm doing this stuff anyways but I am getting more responsibilities you know I don't know good or bad (I#1).

In fact, as a third-year teacher with limited teaching and technology experience Paul was gaining recognition in his building as someone who would embrace technology. Teachers on his floor starting coming to him to ask technology related questions. He believed a commitment to technology would lead to confidence with the use of technology. “I would say anyone who makes a commitment to be someone who is going to use technology a lot is going to gain confidence as they move along, I think that is inevitable” (I#1). The administration at Paul's school recognized his efforts toward technology education and selected him to pilot a one-to-one program for the school.

They picked me actually to be a pilot for a pilot program they are trying to get “one-to-one” here and they need to know how it's going to look in a classroom so I'm going to be getting in mid-January they are giving me a personal device for

every kid in every one of my classes so I'm going to experiment with that and get back to them (I#1).

Paul expressed mixed feelings about the pilot program. He appreciated the recognition that he received for his efforts and the opportunity to experiment with technology. At the same time, he was apprehensive about balancing his classroom with the pilot program.

This is great you know but they just kind of put it on you because you're the person who can do stuff which is fine, but I mean it would be kind of nice if maybe they picked a more senior teacher because I'm still third year, I have a lot of things to figure out other than that (I#1).

Research question 4: What factors of a TPACK-focused professional development appear to have the strongest effect on teachers' actual integration of technology in the classroom?

Paul's experience with technology was very limited prior attending the MAGE institute. He did not have any formal training on teaching with technology while in college. During his first two years of teaching he attended one conference focused on technology in education. For Paul, the MAGE institute was a gateway into using technology, an introduction to the TPACK framework and the opportunity to connect with teachers motivated to improve their teaching with the use of technology.

I went to the MAGE thing down in the University of Minnesota and Macalester and I learned a bunch of stuff there and more importantly I got to talk to teachers at MAGE that had used a lot of this stuff and how it worked so the combination of just being exposed to new technology and seeing how they could help and make teaching easier and improve the learning (I#1).

Throughout the workshop, Paul had the opportunity to hear from other teachers at varying stages of their careers about their experiences with technology. Paul emphasized the value of hearing from peers about their experiences with technology. "Seeing that it

kind of gets a person excited and gets you into it and then I think once you're excited and you're into it it's kind of a downhill deal after that" (I#1). This led Paul to a realization that the challenges associated with teaching with technology existed for his more experienced peers as well and it was motivating to identify that shared experience.

You know, implementation and integration is still a challenge for people that are into technologies and it's always going to be because there's always going to be new stuff new technology and things. That is how I started to change and started to become someone who really valued technology (I#1).

This experience launched Paul into a stronger pursuit of technology. When he returned home after the workshop he started experimenting with the tools he learned about during the workshop and sought out ways to connect with others and stay current with technology trends.

I started getting on newsletters and things from groups that post things about new technologies and new implementation that you need and I'm getting interested in it now. But by no means am I someone who is where I want to be with any of this stuff, you know it's not like I'm there yet, not even close, so I'm on the path and I'm not adverse to trying new stuff (I#1).

It was evident during the fall focus group session that connecting with peers was a very valuable experience for Paul. The two most important things about the MAGE experience for Paul were the connections he made with peers and the opportunity to practice technology.

We just don't spend time learning about stuff. Listening to these guys talk earlier "Jon" and "Elton" about how they were monitoring chats in class real time chats and only allowing certain comments to be posted. I suppose that is something you learn by yourself and maybe you would figure out an answer to it and maybe you wouldn't, but boy just hearing that now you know I'm like what did you use? How did you do that? Because that's I suppose technology, that is pedagogy. You know that's how you are managing the students in your classroom, you know and that's something that may be worth sharing with each other. (F#3).

The Findings from Elliot's Case

Description of Elliot: Six Years of Teaching Experience, Moderate Technology Experience, Large City Technology Magnet School

Elliot is a male social studies teacher in his late 20s who has taught 8th grade global studies for 6 years. He teaches at a technology magnet school in an urban setting. The US News High school ranking reports the population of this school as 95% minority enrollment and 93% economically disadvantaged. Elliot's demeanor is energetic, positive, kind, and confident. When asked how his school year was going Elliot responded by saying, "My year is going great!" (I#2). At the time of the study Elliot was assigned to teach 10th grade human geography with one section of advanced placement human geography. He was looking forward to teaching older, more mature students with the ability to analyze and discuss concepts in more depth than the younger 8th grade students he'd previously instructed. Elliot was attending the MAGE summer institute for the first time.

Elliot's experience with technology.

In terms of being a "digital native" Elliot considers himself a "semi-native". There were a few computers available in his school with internet access and his family owned a personal computer.

I wouldn't say I was digitally illiterate but when I was in school, I graduated in 2006, there was no digital or web 2.0 technologies or instructional technology classes that I took so going into my first year I never really had any courses or anything that taught me how to put technology in my classroom. I really just kind of did it all on my own (I#2).

Elliot is interested in technology personally and professionally. "I am definitely interested in technology outside of teaching. I've done professional video editing and stuff so again

I teach myself what I need to know, but I'm definitely interested in technology so that helps!" (I#2).

He teaches at a school designated as a technology magnet within a larger urban public school district. The school was labeled a technology magnet a few years ago and Elliot believes he was recruited for the magnet because of his technology skills.

I think the technology magnet part has been around for a few years and I would guess there are teachers that were here before the label and from what I understand they are recruiting or they are pulling in new teachers, they are looking for those skills which is one of the reasons why they recruited me (I#2).

Despite the technology focus, Elliot describes a school climate where many of the teachers do not use technology.

Not every teacher- there are teachers here- it's not that they refuse to use it but they don't really implement technology much and that's great for me actually because I'm able to check out my team laptops, my laptop cart more often because other teachers aren't using it (I#2).

The school is divided into team houses and there are two teams per grade. In terms of resources, his 10th grade house has a traveling lap top cart. He shares the lap top cart with 6 or 7 other teachers. His access to the laptop cart is set up on a rotation giving each teacher in the team house two consecutive days of usage. Elliot described issues with connectivity and the internet speed. "Sometimes I'm able to bring my class to a library lab and the desktops are pretty quick, the network is all hardwired but when you are using Wi-Fi in this building, and I've heard from other buildings that the network is kind of boggy" (I#2).

Research question 1: How does a TPACK- focused professional development experience focused within the social studies influence the development of technology efficacy and TPACK in social studies teachers?

Elliot was not familiar with TPACK prior to attending the MAGE institute. He referred to the framework as a useful tool for reflecting on his teaching practice. “I guess with the technology, pedagogy, and content knowledge in that diagram we were looking at, they are all the same size circle but is there one that should be larger than the other or is there one that should be more important?” (I#2). Since Elliot is comfortable with technology he described being cognizant of the rationale behind his use of technology. “It kind of got me thinking a little bit, I don’t know if I have a conclusion, I think for me I tend to reflect on it sometimes and wonder if I am putting too much emphasis into technology” (I#2). As Elliot thought further about TPACK he revealed his concern for his practice was too much focus on technology. “I want to make sure that I’m not using technology and not good sound pedagogy or using technology for my lack of content knowledge in this new course that I’m teaching” (I#2). He believes TPACK helps to frame his instruction, “I don’t want to sway too far one way or the other because that is when you, again if you have a ton of content knowledge and you are just giving notes all day that’s not a very engaging classroom” (I#2).

Strengths and weaknesses of TPACK. Elliot felt that the TPACK framework would serve as a good professional development topic within his school. Even though he is situated in a technology magnet school many of his peers are not comfortable using technology. “I just think it’s not always the older teachers but teachers there’s a lot of teachers that don’t feel comfortable with technology” (I#2). He felt the framework would be useful to exposing teachers to think with technology but believes actual integration would take much more effort.

I've tried to encourage the ones that I'm around to just try it, it kind of takes experimentation and doing it but there are just so many teachers that don't feel comfortable, so using the TPACK model would be good, but I think it would take more to get teachers to start implementing it in their classroom (I#2).

Elliot also found the framework to be a useful tool to help balance the development of a new course.

This is my first year teaching human geography there's a lot of content that I'm reading and getting into so having this out every once in a while, I have to remember to get back, to get my bearings straight, to get back in the middle instead of going way out on the technology side or way over to the content...I know it's good for me to keep it in front of me this year (F#3).

Elliot was asked during each focus group to indicate his position in the TPACK framework and justify his position. His results are shown below in Figure 4.

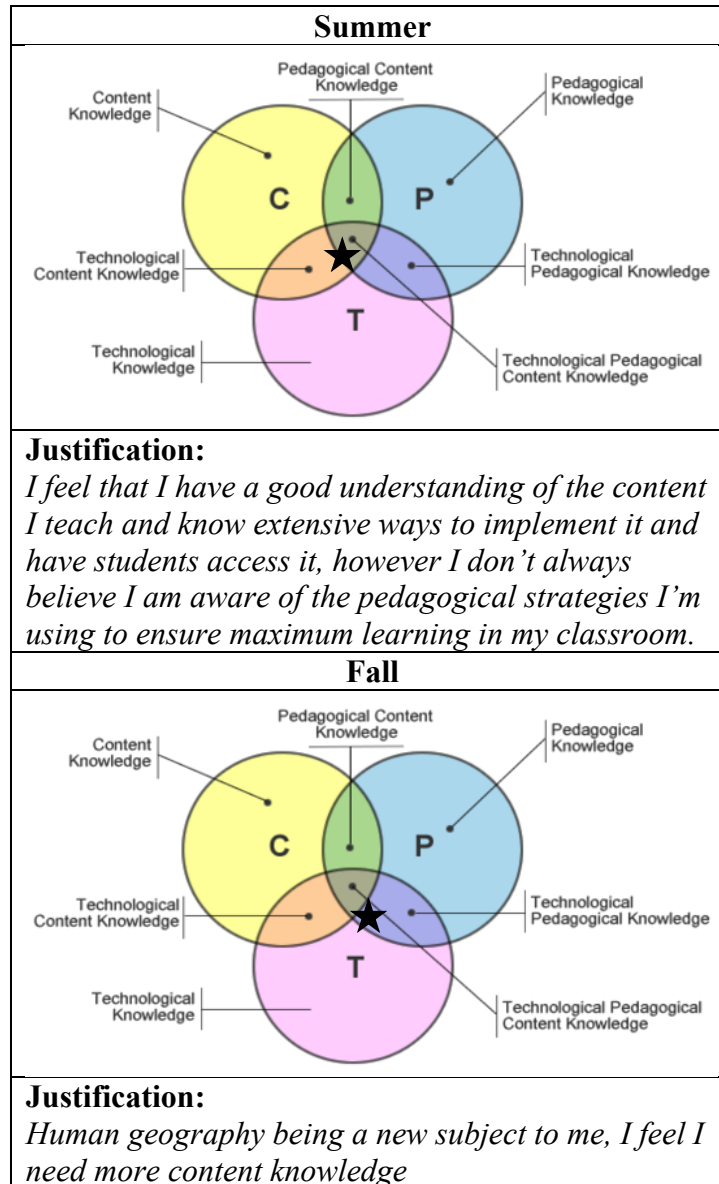


Fig. 4 Elliot's TPACK

Research question 2: How do teachers' beliefs about technology efficacy and TPACK influence their use of technology in the classroom?

At the very start of his teaching career, Elliot came into teaching determined to learn how to use technology in his classroom. "My first year I never really had any courses or anything that taught me how to put technology in my classroom, I really just kind of did it all on my own" (I#2). Elliot teaches in a district that receives Title 1 funding due to the high percentage of children from low-income families. He described the sense of responsibility he felt as a new teacher to use technology in his classroom in hopes that it would better prepare his students for the future.

When I started teaching I kind of feel being in the district that I am in, I kind of felt like I owed it to my students and I'm a geography teacher, is kind of where I started, I kind of felt that I owed it to my students to not give them a bunch of maps and teach them how to use colored pencils but to actually get them onto google maps and at the time it was kind of primitive. I wanted to get them using technology and comfortable with technology for their future, for the sake of them going into some sort of post-secondary, some sort of job field having skills that ranged more than just creating a 10 slide Power point and so that's kind of been my heart in it and so as the years went on and more and more not only just more and more computers were available, more web 2.0 stuff, more ways to get technology into the classroom (I#2).

During an agriculture unit, Elliot explained that one of his peers was using a paper-based simulation to teach his students about farming. Elliot had a different idea about how to teach his students the experience of farming.

I thought maybe there is something out there I could get my students on a computer and simulate what it's like to be a farmer and pretty quickly I found a great website called third world farmer and so now tomorrow I've got all my kids getting online and they're going to play a video game, I mean it's great and it's a video game and they are a farmer and they are learning the frustrations of crops failing and their kids getting sick so they can't go out and farm so their yield goes down and it's all scored out and it's really cool and it's in this online environment so I'm going to have all my kids on that tomorrow and meanwhile, the other guy he's got this piece of paper and it's not that that's bad but um, I kind of feel like my kids are going to get a better view of what it is (I#2).

While Elliot believes in using technology as often as he can in his classroom he is mindful of meaningful integration.

“I can’t just throw my kids on a computer if it’s not going to be productive but when I find a resource I can use and it would be better, more effective for my students to do it online or digitally I do try that” (I#2).

He also plans around the computer resources that are available to him.

I’m sort of limited with our traveling laptop cart, I can’t use it more than a day in a row or two days...if I have something that is going to be four class periods of online I have to figure out a different way, I have to find a different lab that is open (I#2).

Given the fact that there is limited access to technology Elliot carefully selects technology based projects.

I’ve got to really make it count, that one big project just focus on that one whether it’s google maps or iMaps or like that urban map project looks amazing for later on this year, I really want to try that with my team” (F#3).

At times, even when the technology is available, it does not function as planned.

Two weeks ago, I pulled in our computer cart all ready, we were going to do a full day of a couple of activities online. The charger for one row of the laptops wasn’t working, it had blown a fuse so half the class, their laptop wasn’t charged from the day before. I guess in that situation my first thought and what I did, I had students share which was possible in that part of the assignment that we were doing for that day it was ok that they shared computers and then also for the next class I ran and checked out there was actually a library laptop cart I could get and that actually had older computers so they took longer and weren’t working as well but it was a fix and it did work it just took longer than expected for the students. (I#2).

While Elliot admits that problems with technology can be frustrating it does not impact his willingness to try the activity again. “I would definitely place my faith back in technology” (I#2). He understands that it takes time to learn technology, especially when things do not go as planned and he accepts that responsibility. For example, he said if a

website or online activity did not go as planned, he would go home that night and spend the evening trying to figure out a different application.

Research question 3: Why do some teachers more readily adopt technology use in the classroom than others?

Elliot seemed to enter his teaching career with the motivation to learn how to use technology in the classroom. He admits he likes to use technology for his personal use but he also sought out opportunities to further his use of technology professionally.

After my second year, I applied for a grant and I did the ‘best prep instructional technology’ offered at a local university every summer. It’s a week-long seminar type thing and so I remember I did that after my second year and that really got me going and then I’ve kind of just picked things when I could, different courses that are out there or just following different people on twitter that are putting out educational technology stuff and resources and that’s just kind of driven me to keep that in my classroom and keep it going (I#2).

Throughout our discussion, Elliot provided other examples of his willingness to work through challenges and solve problems on his own. He feels there is support from his administration for his use of technology in the classroom, yet there are procedures that must be followed that sometimes cause delays. When asked specifically if he felt he had support for the technology he uses in his classroom he responded by saying,

Yeah, um somewhat. Like this game I was telling you about I had to get to, it was actually blocked by our school server for firewalls so I had to submit a service ticket to my IT to get it unblocked for my students to play and that took a day(I#2).

Despite the fact that his school is labeled a technology magnet school, and he believes the administration wants him to employ technology, he encounters roadblocks. “There are some other things I’ve been trying to do like doctupos and some different Google aps that the school district does not let us, but I feel it will be valuable” (I#2). Sometimes there is problems with the hardware.

I don't feel supported in different things like in the way our network is not really handling a classroom of thirty computers on the WI-FI and things that are blocked and what is not allowed in school and that so I don't always feel supported from a district standpoint (I#2).

Elliot seems to have a positive attitude toward the challenges he faces and seems confident in his ability to seek and implement a solution. "I guess where I'm coming from if I go out and find a resource I want to use and I can't use it in school I do what I can to figure out a way" (I#2). For example, Elliot described an instance when he was facing an obstacle and thought through a solution to bring technology into his classroom. "If the school wasn't going to unblock this site I was going to try to find a proxy site I could put it through to get it in" (I#2). He seems comfortable and accepting of the work he needs to do to bring technology into his classroom. "Like YouTube, for the most part we can access it at school but for a few years we couldn't so I was figuring out proxies and how to bring YouTube into my class so I do figure out work arounds" (I#2). Elliot seems energized by technology and enjoys thinking about how to use it in meaningful ways in his classroom. He described how he thinks about technology when planning a new course.

As I'm teaching this new class and really the class I taught before and as I'm piecing together resources or looking at our test book or whatever I'm ultimately and ideally looking for an iPad classroom, that every day we would be paperless, we would be online so that is sort of what I'm shooting for (I#2).

Within his building Elliot is known for his ability to work with technology. Colleagues seek him out for help troubleshooting technology related problems. When Elliot runs into a problem he usually tries to solve it on his own or he seeks the advice of his

colleagues. He finds it useful to have a friend in the technology office because he can get help, present ideas and gain insight into the district.

I usually try to figure it out on my own or I do have friends in the district, actually maybe one or two, I have one good friend he moved over to the new office of technology integration and so I kind of call on him when I need something or to find out what's going on in our district or if I have ideas (I#2).

At times, Elliot will utilize the internet and social media to troubleshoot technology related issues. "I'd say it's a split between going out on Google and figuring it out on my own or even just on Twitter, people I don't really know in person, people on my PLN on Twitter and figure it out" (I#2). Elliot has a very positive disposition toward the use of technology and seems to accept the fact that using technology will always be paralleled with troubleshooting technology and working through issues as they arise.

Research question 4: What factors of a TPACK-focused professional development appear to have the strongest effect on teachers' actual integration of technology in the classroom?

According to Elliot the factors of the workshop that had the greatest impact on his professional development were related to pedagogy. Elliot revealed that he was comfortable with technology before attending MAGE. Further, he feels confident in his ability to navigate the content he's required to teach in his classroom. "Really, the content is no problem for me I can take the weekend and read and figure something out" (I#2). Instead, Elliot found benefit in learning about pedagogy. "It's the delivery in the classroom, the pedagogical approach that we did and doing those lessons, I definitely took the most value from that, definitely" (I#2). He went on to describe how he had already worked through much of the technology that was presented during the workshop. "Where I'm coming from in the technology aspect, the technology stuff I've already

sifted through all those sites and figured out what I like and what I don't like so I've already kind of done that" (I#2). One of the most valuable experiences for Elliot was working in the lab. He thoroughly enjoyed the opportunity to work in the lab and have time to explore online mapping and Geothentic. In part, this was valuable because these were tools that Elliot had tried to use unsuccessfully in the past. "Getting online and doing the ESRE maps and analysis, that was really good for me. I've done a little bit of online mapping and I've tried Geothentic before- it didn't work out so well" (I#2). The opportunity to see it modeled and then immediately work on it in the lab was very beneficial for Elliot. "When we got online and made a map that was exactly what I needed and like I was saying, teachers who haven't done that before, that's what we need to feel comfortable in our classroom to do it" (I#2). In that response, Elliot revealed that even despite his comfort level with technology it's imperative that teachers feel confident with the tools before applying them in the classroom.

The Findings from Mark's Case

Description of Mark: 6 Years of Teaching Experience, Moderate Technology Experience, Large Suburban Public School

Mark is a male teacher in his late 20s who teaches 9th grade Advanced Placement (AP) human geography in a large suburban school. He claims his school year is going pretty well but admits that the transition for his 9th grade students into the high school is challenging for them in a number of ways. Mark describes the use of technology in his school building as “uneven” and attributes this to the mix of experienced, traditional teachers and the influx of new teachers with aptitude toward technology. Despite his interest in technology he finds using it in the school is frustrating. There is not a direct line of communication to the technology department which often forces him to create a “work-around” in order to make technology work in his classroom. Mark attributes some of this difficulty to a virus that impacted the district.

About 6 or 7 years ago we had a huge virus that went through our whole network and in our district and they've been on protectionist mode ever since and so it's very restrictive in terms of access and so that's been in one word frustrating (I#3).

Despite the struggles, he believes technology is becoming more of a priority at the district level resulting in a number of pilot programs throughout the school. Mark admits he has more technology in his classroom than most teachers. He has almost a full set of iPads, and several Chromebooks but quickly adds that there isn't a formal plan for technology integration. “It's kind of like we keep picking, like kind of wandering down certain paths without really a real purpose or goal” (I#3). While there isn't a formal technology policy

in place they are trying to work on one within the school. The lack of direction is frustrating to Mark.

I have all these iPads and yet I'm not allowed to use them. I have a mac I wasn't allowed to use that to sync my computer, yet they give me no training or access to do it myself, stuff that doesn't even make sense at a management level but they throw thousands of dollars of resources at me which is wonderful, I'm not going to complain about that but when I look at that, that is not going to be helpful to a whole district implementation that we are working on a plan and where we get the resources and we have our own bring your device to work policy but its depending on the teacher, its used unevenly so it's kind of a work in progress and I think we're kind of trying to find a very common message and a common goal for our building and in the meantime it's been kind of mis-mashed (I#3).

Mark's experience with technology. When Mark started teaching nearly seven years ago he owned a laptop and he was curious about technology. During the first several years of his teaching career he did not use a lot of technology in his classroom. It's only been more recently that he's focused on technology integration. "It's really been the last three or four years that I've found myself kind of really trying to push for it and try to integrate it into my classroom" (I#3). He credits his colleague for getting him started. "I think it coincides with another friend of mine in the department who came in really knowing a lot about technology and we started talking a lot and seeing different ways we could use it and it kind of went from there (I#3). Mark reflected on how little he knew about technology when he began teaching and the impact personal devices have had on his classroom technology use.

I think back to how little I knew about technology in 2006 when I started and it's kind of funny because I never really thought about it and I think it's because it wasn't accessible you know at a classroom level and I think as more of these personal devices and this new personal device generation for technology is making it accessible, and makes you think more about just getting a projector. That was a big deal when I started teaching, just to have a projector (I#3).

Research question 1: How does a TPACK- focused professional development experience focused within the social studies influence the development of technology efficacy and TPACK in social studies teachers?

The experience of attending MAGE for Mark seemed transformative in his approach to teaching. At the time of this study, Mark was attending MAGE for the second time. Mark is very reflective and described many examples of how he was able to use his experience at MAGE to shape his thinking with technology. This included discussion surrounding the interplay between his knowledge of the content, effective pedagogy, and the integration of technology. For him, TPACK served as a reminder to regularly consider how each facet of his instruction worked together.

I've never really spent time during the school year necessarily thinking about it so kind of coming back to it the second time it's always kind of like a good, oh yeah this is good stuff to think about as a self-reflection (F#1).

Mark described himself as having a TPACK mindset in that he attempts to approach his lessons aware of the balance between technology, pedagogy and content. He felt that being confident even in one area within TPACK allowed for more efficient teaching practice. "When you feel really confident about it and what you need kids to know and how you are going to get them there and it creates time because you are not meandering" (I#3). Therefore, understanding TPACK allowed Mark the opportunity to think about how to approach his teaching.

I think when you first start out in any curriculum or any course I think sometimes you find yourself spending too much time in one place and you are not spending time in another and you have to double back because you didn't do it well the first time so I think there is a lot of ways to waste time not that you punish the students but you can be more efficient, more productive in what you cover in the classroom(I#3).

Mark is comfortable using technology and desires to use it in his classroom every day. “I have this burden that I should be using technology constantly”. On several occasions during the interview Mark used the word “burden” to describe his feelings toward the use of technology. The idea of burden seemed to come from the obligation Mark felt toward using the plentiful resources in his classroom and a responsibility to his students to help them become comfortable and competent in the use of technology for the betterment of their future.

He sees the value in TPACK as a tool to consider how to use technology in his lessons.

You can get pulled into the technology realm of it and you need to double back and see what is important and that gets into the pedagogy and the content and stuff and so it’s kind of a good check on each other and they really support each other well (I#3).

Further, he described that as his confidence with content increased, he felt it presented more opportunity for him to use technology. “I think it allows for those opportunities to dig deeper, I think the technology makes it more engaging, sometimes it’s as simple as letting kids explore a little” (I#3). In contrast, Mark described the struggle associated with teaching a new course with new technology.

I think that is why last year was really hard I was trying to do both; I got new iPads last year and I was trying to take on an AP human geography course that I wasn’t, I mean I still don’t feel like I’m competent, I still feel like I’m scrambling and trying to learn and yet it’s so much better this year, just going through it once (I#3).

Despite the fact that he was motivated and interested in using technology and had six years of teaching experience he found himself struggling to balance content and technology.

Last year I think I was overwhelmed- how do I do both? I was trying to integrate technology with a new course I'm not quite sure where I'm going with it and I was trying to do two things at once and it was a really hard go personally (I#3).

He believes his hard work and diligence created a productive learning environment for his students.

I mean, the class was fine just because I was really trying to invest in both areas it's tough when you don't have one of them so when you can play on each other, when you have experience in a course you see opportunities for technology right away and you're like 'oh cool' if we go do this, we can take it here, then you start looking for the tools (I#3).

Enthusiastically, Mark described how using technology even in a basic form can be used to make the content come alive.

I think about some of the stuff we've done with images in the geography class and how powerful that can be and sometimes just using Google Earth to do that, to go to a place and see an image, it's that simple but the engagement can be huge versus talking about a concept out of the textbook (I#3).

Mark considers technology in tandem with pedagogy as a hook to attract the attention of his students. He realizes that for some of his students the only opportunity they have to interact with technology is during his class.

You have to have that engagement piece and that's where that technology piece literally can be the same thing, you put it on a big screen and that's your hook it's silly and it's not the best hook but sometimes that is what kids need so that might be it. You know some kid who doesn't have the means that has an iPad in his hands that might be the only time he gets to use it, whatever that might be (I#3).

Strengths and weaknesses of TPACK. In consideration of the TPACK framework Mark commented about ways in which he thought the framework should be expanded. "I almost feel like there is another dimension to the TPACK that I don't even know if I can describe it or visualize it" (I#3). He went on to describe his idea about expanding the model.

It is sort of like this evaluation if you were going to make it three dimensional like you have these things, it's almost like a tent with stakes and you have the lines staked out and when they have equal tension it keeps you in the middle but when over time you are growing, if you are doing it really well and it becomes seamless and the way you use it in your classroom, the kids embrace it differently, you can use it functionally and you are not stumbling around, you know where the troubleshooting is going to be so when you have those tech problems you can make it more seamless to get around it but then it builds on each other(I#3).

Mark was asked during each focus group to indicate his position in the TPACK framework and justify his position. His results are shown below in Figure 5.

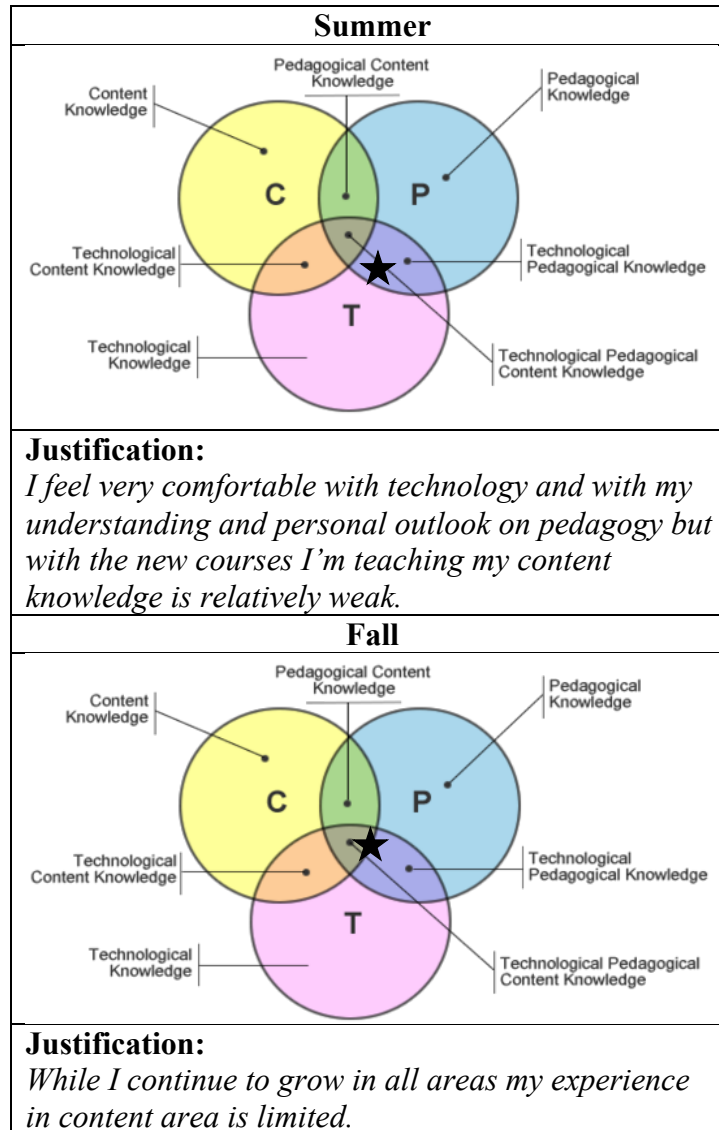


Fig. 5 Mark's TPACK

Research question 2: How do teachers' beliefs about technology efficacy and TPACK influence their use of technology in the classroom?

Mark is comfortable using technology in the classroom and strives to improve his integration on a continuous basis. He believes he has an obligation to his students to use technology in order to prepare them to be competent citizens, prepared to enter the workforce. He shared numerous examples of the challenges he faces with technology in his district. Although he admits it can be frustrating at times, he never gives up.

I wanted to use the iPad to do something and have the kids show what they were doing on the projector but they didn't want to allow my computer to be on the same network and so I was going to use my own Apple TV to do it and they won't let me put that on the network, they won't even give anyone the network code to even if you are on staff to use another school device (I#3).

On another occasion Mark described how he purchased equipment as a work around to allow students access to technology in his classroom.

I bought a used printer from our school- our school does like an eBay program with our students and I bought a district printer so that I could hook up an old laptop and let kids access and print documents in my classroom if they needed notes if they forgot just to have access. They won't allow me to use that on the network (I#3).

This was clearly frustrating to Mark. He felt as though he was working hard to support students and not receiving the support he needed to be successful in his classroom.

These are things that to me were directly tied to supporting students, had nothing to do with me doing anything other than helping kids set my classroom up to be for student success and then not really having an avenue to say this is why I need to do it. It's like submit a ticket and then you don't know who it goes to (I#3).

At times access to certain online tools were restricted. "There are other things like just trying to get to websites, we couldn't even use You Tube. They've released that now"

(I#3). He described how he believed the district missed an opportunity to model the appropriate use of social media.

And things like something as simple as Twitter when it was in its newer phases when kids didn't use it, yet it wasn't a popular thing to use they were very scared of it and now it has become the popular thing but I feel we missed an opportunity because they would to allow that access in the school where we could have been modeling really healthy, social media use and how powerful the tools can be but now you're kind of jumping in on the party- you're crashing it now that they are use it (I#3).

There are other obstacles in place that hamper Mark's ability to be productive with his use of technology.

We cannot update our computers, even an Adobe Flash update and updates that are sent out for software they won't allow updates unless the district does it. We can't add anything; we cannot add extensions on Google Chrome. Every time we shut off a school issued computer it resets itself so any manipulation to make it personalized gets wiped out clean daily (I#3).

Mark has developed a strategy for approaching technology. He works through the challenges as they occur and he tries to concentrate on one thing at a time.

So, I continue to push forward. But I've learned that I need to focus on a few things that I can't be wandering around with my kids. I have to give them a very specific tool that we are going to get good with so that they'd don't get frustrated (I#3).

He realizes his students will experience frustration with technology and that is part of learning.

"They might have frustrations along the way but these are some very basic things that we'll always use and then you know every once in a while, we will try other things"

(I#3). Mark has elected to teach his students some basic tools because he believes these are the skills that will help them succeed after graduation.

For example, right now just getting them to use google suite and knowing how to share folders and to navigate Gmail. I mean as simple as it is but I mean

navigating Gmail in a shared google drive folder for a lot of them is all they can handle, but those are like those necessary skills (I#3).

Research question 3: Why do some teachers more readily adopt technology use in the classroom than others?

Mark is genuinely dedicated to using technology because he believes it is best for his students. “So there’s a part of me that is really deeply committed to that idea and it doesn’t really matter what I am teaching” (I#3). He strives to model appropriate use of technology for his students. “I think they need to use it to be familiar with it” (I#3). Mark feels very strongly that technology is an undeniable facet of life and for that reason it needs to be incorporated into education.

I think I’ve heard someone talk about technology as being a 5th limb, that skill or necessary part of our everyday lives and students and I know teachers, it’s just reality, it’s not a course in itself so it has to be sort of our natural educational environment to expose kids to it, to use it ourselves, to model it (F#1).

Part of the challenge for Mark is convincing his students that they should be interested in learning technology. He contends there’s a big false assumption that all kids are digitally minded.

They don’t understand how silly they sound as 14-15 year olds saying ‘I just hate technology and it’s stupid and I don’t know it and I’m terrible with it. And I just think you know what? That is such a turnoff for their generation that is just going to hurt them and I don’t want to set that up for them (I#3).

He cares about his students and works to prepare them for their future. Mark believes his students should leave his classroom prepared to live in a world reliant on the use of technology.

I think initially it was a lot of my own curiosity and I think I’ve become like I’ve mentioned before I see a real need for kids to have real experiences with it that

isn't just because of entertainment and even to just model effective communication how they act in a digital sense (I#3).

While Mark is able to learn technology pretty quickly he recognizes that many of his students lack a purposeful use of technology.

I'm always amazed because I'm always tinkering. I get thrown into new environments and I'm able to navigate them pretty easily and I see the kids that aren't able to do that because they just consume. They are not really using it for any purpose other than to be entertained (I#3).

His position remains that students need to be prepared to use technology in meaningful ways.

I think it's a huge skill we need to consume in education to help them become comfortable with technology in a way that they are not scared of it, that they can figure out their own workarounds when they run into problems and that they're familiar with different interfaces that they can just navigate (I#3).

Mark continues to advocate for technology on behalf of his students because he believes it's the right thing to do. "I think it's a huge part of an unwritten standard that I think we need to prepare kids for" (I#3). He wants them to be successful and employable. "I mean you hear it all the time for them to compete in the marketplace they need to have skills that are productive and functional, not just that they are good with social media" (I#3).

Overcoming challenges with technology. Mark admits he encounters many roadblocks with the use of technology in his classroom. At times, it can be very frustrating.

You know, the frustration, at one point I wrote a pretty strongly worded letter to our tech leadership in our district and I was invited to be part of our tech committee that met a few times and then I think it continued on but I'm not sure if I was just not invited back or I'm not quite sure what happened but it kind of just ended or at least my participation in it ended (I#3).

For Mark, it became easier to manage his classroom independently and not ask the district or anyone in the building for help.

I just honestly, I work under the radar, I don't ask for permission. I just do it you know, hope I don't get caught and if I do I know that I can defend it by support to my students for what I am doing in the classroom to promote student learning and hope that will be enough to convince people if there is ever a reason that they want to call me out (I#3).

Even though Mark is prepared to defend his position should it ever come into question he does not believe that will happen.

What I've found is they're really not interested in doing that, they don't really care. It's more that there's a concern, I'm not sure what their fear is but they kind of turn their head (I#3).

Rather, his bigger concern is that when technology fails it leaves a bad impression with his students. "My biggest fear when that happens is oh like the kids will say 'I hate technology' and not want to use it" (I#3). When technology fails in the classroom it does not hamper Mark's approach. "It doesn't really deter me- it just happens just as much as a lesson bombs that you think is great so does a lesson with technology, it just bombs in a different way" (I#3). He is comfortable coming up with an alternative plan. "Most of the time you can find a work around. I feel like I've been teaching long enough that I can kind of have a natural way of figuring something out just to either move on or re-direct to find another way to do it" (I#3). In fact, Mark's strategy is simple. "I try to stay calm and not freak out" (I#3) and he tries to use it to model problem solving for his students.

I talk to the kids all the time and say this is going to happen let's stay focused with what we are going to do and I'll push through and figure out the problem ok? We have to re-think how we are going to do this and work through the problem with them. I just think I want to be persistent about the goal (I#3).

Mark is invested in the use of technology which helps him focus on his bigger goals of developing competent students. He expects things do not always go as planned and adjusts accordingly.

Some days you give up a day and yesterday was a complete bomb because kids couldn't get signed into their accounts and they get signed in and then the network was dropping them and it was just a bad day. And you know what? We did something almost identical today and it worked just fine and so you know it was seamless and I don't know why but it happened (I#3).

The population of Mark's students has shifted over the course of his career to a great mix of high level and low level students. Mark attributes this shift to AP courses. He finds this allows him the opportunity for great differentiation. "I see more tiered groupings of students and I think it allowed me to have a mindset of differentiation" (I#3). This has forced Mark to approach his lessons differently. "I totally had to disengage the way I've always done things and just try because it feels totally awkward sometimes" (I#3). Mark found that using tools to augment differentiation in his classroom was a big adjustment. "You're not presenting the information to the kids anymore. It feels awkward because it feels like you are giving up control" (I#3). Although he is willing to make this shift he admits it's difficult. "I am still working on truly giving up that absolute control to get that great differentiation" (I#3). This is a process that takes time and refinement.

I'm slowly going back and when you've done things several times you're like well this lesson works, to adopt technology you really have to be committed to the idea of it because you divorce yourself from some things that you feel pretty good about but you can see it might be more beneficial (I#3).

Mark is conscious about his efforts to employ technology. "I try to be more focused on planning, to think about it every time I'm making a lesson. A lot of times it's

on the fly- how could I do this differently and the idea just hits me and I just try it and sometimes it crashes and burns” (I#3). Even when things do not go as planned, Mark perceivers, he believes it’s his obligation to do so. “I have this constant burden; this district has invested an incredible amount of resources in my classroom and I have an obligation to really push how I integrate” (I#3). He is committed to finding the time to use technology meaningfully.

I can’t have days, too many days where there not used there more than just hey here’s a digital quiz. I have to look for ways I can use them to serve students and that’s a challenge and that is one of the things that makes things busy because I always have this extra layer of trying to make sure and then not getting caught up in the idea ‘oh I just got to use technology’ but truly use it in a way that is going to be useful not just to use it. (I#3).

Research question 4: What factors of a TPACK-focused professional development appear to have the strongest effect on teachers’ actual integration of technology in the classroom?

For Mark, having the opportunity to be a student and spend time learning and exploring was valuable to his own development and helpful in his outlook about his own classroom.

I think a big part of this is that we tell kids it’s ok to fail, to engage them, it’s ok to fail but we don’t accept failure we want to have control of the daily stuff, we don’t accept failure, well you know but we preach it. I think this is a huge part of this, it’s being...I think a big part of it is the time pressure where we all feel like we have to get too far in too little time so being able to embrace some of that failure along the way again I think models it too. How well do you handle those moments of chaos and turn it into something and I think those are the little lessons within the lessons that kids can indirectly take from it (F#1)?

When asked which factors about MAGE had the biggest influence on Mark his answer was clear, it was the people.

Honestly, it’s the people. It’s the expertise and the willingness to help it’s been the best professional development I’ve ever been a part of. I’ve been to a fair

amount of conferences and I'm just amazed at how willing everyone has been (I#3).

He commented on the TPACK model as a strength of the experience. He compared the delivery of the workshop to the TPACK framework relating the expertise of each instructor to the categories in TPACK. "...with pedagogy, with the content, and the technology, and they kind of model the TPACK model just in how they operate and how they present themselves even while we are there" (I#3). The most valuable component of the workshop in Mark's opinion was the relationships he developed. "Just the people and the professional development through the connections. I can't say that is was this tool or this session was the best it was that I've developed these relationships as a part of it professionally" (I#3).

You sort of establish these relationships with people you now know and people that are doing some pretty good stuff and you want to share and so those connections are valuable and again, the people that are not only the leadership but the people that come back just to connect a bit" (F#3).

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

In the previous chapter I described the experience of three teachers who participated in a TPACK focused professional development workshop designed to improve their understanding of how to effectively use technology to teach social studies. More specifically, I considered whether participation in the workshop influenced teachers' technology efficacy and their TPACK while looking closely at why some teachers more readily adopt technology than others. I was further interested to learn the ways in which teachers were influenced to use technology in their classroom because of participating in this workshop.

In this final chapter I will discuss the themes that emerged through the cross-analysis of the cases studied and describe how the findings may help those involved in professional development opportunities, especially social studies teachers seeking to improve their use of technology and educators seeking to design effective technology infused professional development. Lastly, limitations of this study will be addressed in this chapter.

Discussion

The overarching goal of this research was to identify what factors of participation in a TPACK-focused professional development workshop help teachers learn to use and become comfortable with technology and what factors influence their use of technology in the classroom. To accomplish this goal, the following four research questions were explored in depth.

1. How does a TPACK-focused professional development experience focused within the social studies influence the development of technology efficacy and TPACK in social studies teachers?
2. How do teachers' beliefs about technology efficacy and TPACK influence their use of technology in the classroom?
3. Why do some teachers more readily adopt technology use in the classroom than others?
4. What factors of a TPACK-focused professional development appear to have the strongest effect on teachers' actual integration of technology in the classroom?

As the data was examined the following common themes emerged from the three cases that served as the basis of this study.

- Seeing technology modeled in meaningful applications paired with the opportunity to practice or “become a student” is very useful
- TPACK is a useful framework for balancing all facets of knowledge in the classroom
- Teachers who believe in the value of technology in the classroom are willing to persevere and overcome obstacles
- Teachers who believe in using technology do not blame the technology when things do not go as planned, rather they take responsibility for their own actions and seek to improve
- Participating in MAGE was a very positive learning experience and connecting with peers is one of the biggest benefits of attendance
- Beliefs are a strong indicator of actions

The three teachers studied in these cases came in to teaching with little or no formal training on the use of technology in teaching. At the time of the study, each teacher was employed full time. For each of them, technology was available in their school to varying degrees, and the use of available technology was encouraged, but not established as a requirement by their district. In other words, none of the teachers were being “forced” to use technology. Instead, they each described how they believed that the use of technology would benefit their students and this belief became a driver and motivator to embark on self-selected opportunities to learn to teach with technology.

Throughout this study these three teachers described the ways in which their efficacy toward technology was improved because of participation in this workshop. Additionally, the teachers revealed through their testimony that they all possessed positive beliefs about their use of technology in the classroom. Each described a deep sense of responsibility to their students; to effectively learn, model, and teach technology in their classrooms. Each teacher talked about the use of technology in strong terms like, “I owe it to my students”, “I feel a responsibility to do this”. They also all stated without doubt that they realize, understand, and accept that technology does not always go as planned and sometimes it completely fails but they all stated without hesitation that they will continue to use technology in their teaching practice. This sense of belief allowed them to persevere through many obstacles and challenges. Each of them described numerous instances of roadblocks, were willing to repeat a failed lesson, spent personal time learning and trouble-shooting technology, and maintained a positive attitude toward technology.

The findings of this study are consistent with the literature (Beck & Eno, 2012; Schell & Mohan 2013; Doering, Scharber, Miller, & Velesianos 2009) which revealed teachers enter the classroom lacking the skills necessary to use technology in meaningfully ways to teach geography. Each of the teachers identified in the cases indicated that they did not receive any formal training on the use of technology during their college education. Paul considered his technology “non-existent” when he entered the classroom. Elliot described him-self as a “semi-native” to technology because his family owned a personal computer and there were a few computers available in his high school. In terms of his teacher education, Elliot revealed that he did not have any formal courses that taught him how to use technology in the classroom. When Mark began his teaching career he owned a laptop and was curious about technology, but admits he did not use very much technology in his classroom during the first seven years of his career.

The findings of this study align with the research conducted by Fullan & Stigelbauer (1991) which indicated a change in teachers’ behavior must occur in at least one of the following dimensions: (a) beliefs, attitudes, or pedagogical ideologies; (b) content knowledge; (c) pedagogical knowledge of instructional practices, strategies, methods, or approaches; and (d) novel or altered instructional resources, technology or materials. Paul’s beliefs about using technology in the classroom were shaped after he became a teacher. He didn’t have any experience with technology as he began his teaching career, didn’t have plans to use technology and in fact, didn’t even own a cell phone! For Paul, choosing to attend MAGE to obtain graduate credits turned out to be a transformative experience. In consideration of the dimensions for change described by Fullan & Stigelbauer (1991) Paul’s shift in behavior aligns with a change in beliefs,

attitudes or pedagogical ideologies. After attending MAGE, he changed his ideas about technology. He started using technology in his classroom, accepted the challenges presented, and was realistic in his approach, both in the time it would take to integrate technology and the setbacks he would realize as a part of his growth.

For Elliot, initially, his beliefs about technology were influenced by his perception that the students in his district needed to learn how to use technology effectively for the sake of their future. Elliot repeatedly stated that he felt he “owed” it to his students to use technology effectively in the classroom, to help them become comfortable with technology, in hopes that it would help them get a job after high school graduation. For Elliot, he was most influenced by the pedagogical strategies that were introduced during the workshop.

In consideration of Fullan & Stigelbauer (1991) required dimensions for change, Mark’s earlier influences toward technology could be attributed to “altered instructional resources, technology, or materials”. He contends he didn’t think a lot about technology early in his career because it simply was not accessible. As personal resources became more prevalent, Mark began thinking more about integration. Mark became focused on how to incorporate technology in his classroom. He stated many times that he felt a “burden” to use technology all the time, that he was “deeply committed to that idea (of technology)” regardless of what he was teaching. Mark also credited a departmental colleague for his increased use of technology. They worked together, bouncing ideas off one another and considering all the ways in which they could incorporate technology in the classroom.

The design of this workshop was useful in influencing a stronger sense of technology efficacy among the three teachers represented in the cases. As described in the literature review of this study, Bandura (1994) maintains that beliefs about self-efficacy are developed through four main sources of influence; mastery, vicarious experiences, social persuasion, reducing stress reactions. The deliberate and careful design of this workshop provided opportunities for participants to develop their self-efficacy using some of these sources of influence. Throughout discussions with each participant they cited examples of how their experiences at MAGE deepened their technology self-efficacy.

Mastery experiences. During the workshop participants had the opportunity to use the technology that was being demonstrated by the expert leaders. Many of the participants commented on what a rare but powerful experience it was to be afforded the opportunity to “be a student” and to “play” for a solid block of time. This provided an opportunity to practice the technology and establish a positive experience with the technology prior to bringing it into the classroom. Bandura (1994) reminds us that, “A resilient sense of efficacy requires experience in overcoming obstacles through perseverant effort” (p. 72). For example, Elliot described the experience of using Geothentic unsuccessfully in the past. During the workshop, he had the opportunity to try it again in the lab. “When we got online and made a map that was exactly what I needed and like I was saying, teachers who haven’t done that before, that’s what we need to feel comfortable in our classrooms to do it” (I#2).

Paul also displayed an evolution in his self-efficacy that could be attributed to mastery experiences. Per Bandura (1994), “Successes build a robust belief in one’s

personal efficacy” (p. 72). Paul was attending MAGE for the second time when he participated in this study. The training he received during his first attendance at MAGE coupled with “mastery experiences” helped to shape his self-efficacy toward technology that produced a change he described as follows, “You know, I think about where I started in my first year and I was completely hopeless at technology and through effort I think I’ve come a super, super long way, and I feel so differently about it now than I did two years ago, just 100% differently” (F#1). The change in Paul was even recognizable by another MAGE attendee who commented that Paul’s presence and his comfort level was visibility different than the previous year. In the year between Paul’s attendance at the workshop he had the opportunity to experiment with technology, was given resources to use in his classroom, and was assigned a lead role in a technology integration project at his school.

Vicarious Experiences. Paul, as a novice teacher benefited vicariously by listening to the experiences of other teachers participating in the MAGE institute. The experience of learning vicariously is defined by Bandura (1994), “Seeing people similar to oneself succeed by sustained effort raises observers’ beliefs that they too possess the capabilities to master comparable activities required to succeed” (p.72). At the time of the study Paul was new to both teaching and technology. He reported a shift in his attitude toward technology because of listening to other teachers talk about their experiences and specifically their struggles. He realized that even veteran teachers struggle with the implementation and integration of technology. Paul had this to say, “You know, implementation and integration is still a challenge for people that are into

technologies and it's always going to be because there's always going to be new stuff, new technologies and things. That is how I started to change and started to become someone who really valued technology" (I#1). In another instance, Paul shared how merely hearing others talk about their experiences with technology was motivating, "Seeing that it kind of gets a person excited and gets you into it and then I think once you're excited and you're into it it's kind of a downhill deal after that" (I#1).

The literature states that professional development as a strategy for assisting teachers with technology integration can be successful if certain criteria are met. The design of this workshop aligned with the criteria for technology focused professional development set forth by Hew & Brush (2007) which defines a successful experience as one that includes a focus on content, gives teachers opportunities to practice, and aligns with teacher needs. The findings of this study further support that rationale.

For Paul, connecting with others and practicing the use of new technologies were the most valuable components of his experience. He described the benefit to him of having the opportunity to connect with peers regarding the use of technology because this was something he rarely got to experience during the school year. Mark was also attending MAGE for the second time. On the TPACK model Mark indicated that he was comfortable with his technology and pedagogy but with new courses assigned his content knowledge was weak. The most valuable component of MAGE for Mark was the people. He believed the connections he formed with fellow teachers as well as the extensive modeling of the content that occurred throughout the workshop was invaluable.

Elliot entered MAGE feeling confident about his use of technology, in fact he shared that TPACK was a helpful reminder to balance pedagogy and content with his

solid use of technology. He felt at times, his comfort level with technology would compensate for his lack of pedagogical knowledge. The most valuable component of attending MAGE for Elliot was the opportunity to learn effective pedagogical approaches to the use of technology in the classroom.

Each of these teachers described numerous examples of barriers they've experienced while using technology in the classroom. Research conducted by Doering, Koseoglu, Scharber, Henrickson, & Lanegran (2014), suggested that "...implementation of thoughtfully designed, content specific professional development programs and supported guidance in exploring technology integration models may help schools and teachers overcome these realities and barriers" (p. 223). The findings of this study generated evidence that support their research.

The burden associated with the use of technology is well documented in the literature (Ertmer, 1999; Hew & Brush, 2007; Kopcha, 2012). The results of this study are consistent with the findings in the literature. Many of the struggles associated with technology revealed themselves in this study too through the deposition of these teachers who bravely shared their concerns, fears, and failures. And yet, despite these obstacles these teachers successfully and willingly employ technology in their classroom. They work hard, overcome obstacles, endure failure, and try again. They all indicated that they accept set-backs. Paul shared how he dealt with challenges in his classroom and on a larger scale within his building. In his classroom Paul said he doesn't "shy away" from a tool if it doesn't go well, rather he contended that it was likely "his fault not the tool" and he needed to further think through his approach (I#1). Within his building he shared

that he doesn't feel supported in his use of technology. For him, however he believes that "if you are going to make it work you have to do it, you have to make it work" (I#1).

As a new teacher, Paul felt he had a lot to learn in all areas of his practice. One of the benefits for him in attending MAGE was to listen to veteran teachers with more technology experience describe the challenges they faced with technology integration. This seemed to be an "A-HA" moment for Paul. Through his experience at MAGE he realized that technology was a challenge even for people who "are into it" and that it's "always going to be" and Paul said that is how he "started to change and become someone who really valued technology".

Elliot was very forthcoming in describing his solid comfort level with technology. Not surprising, he reported that he would "definitely put his faith back in technology" when something doesn't go as planned (I#2). The barriers that Eliot faced regularly could be attributed to the infrastructure of his building and limited resources. His testimony was filled with examples of the many ways in which he had to work around the system to bring technology into his classroom. For example, he shared, "...if I go out and find a resource I want to use and I can't use it in the school I do what I can to figure out a way" (I#2). Elliot felt confident in his ability to use technology and learn new content. For him, MAGE offered him the opportunity to see effective pedagogical strategies modeled.

Similar to Elliot, Mark indicated he was fairly confident in his use of technology and the ability to figure things out on his own. In fact, Mark even commented on the learning value of technology failing in class. He believed it provides an opportunity for him to troubleshoot in real time with his students. Rather, he attributed his greatest

frustrations with technology to various parameters set forth by his district that he felt impeded his ability to use technology. Mark contended MAGE was “the best professional development he’d ever been a part of” (I#3). He attributes the success of MAGE to the “expertise and willingness to help” and greatly valued the relationships he established through this professional development.

The effectiveness of this professional development experience is inherent in the design, delivery, and practice afforded to the participants. TPACK was used as the framework to develop material, delivered by experts who represent each facet of the framework paired with the availability of experiences that can influence self-efficacy which creates an opportunity for behavior to be positively influenced. For example, the deliberate design of MAGE was recognized and described by Mark as he likened the delivery of the workshop to the TPACK framework describing how there was an expert that represented each area of knowledge. For Mark, this mode of delivery was useful and motivating.

Recommendations and limitations

This study has direct implications for those educators involved in the design of technology related professional development. This research sought to shed insight into what propels some teachers to use technology, to understand what type of teacher training helps teachers become better, and what factors influence teachers use of technology. This information is useful to those engaged in the design of professional development. It further serves to inform social studies teachers on the type of professional development that is useful in learning how to effectively combine technology, content, and pedagogical strategies in the classroom. The testimony of these cases supports the notion

that professional development that is thoughtfully designed, offers content specific materials, while modeling implementation strategies with supported guidance is effective in the influence of teacher's use of technology in the classroom.

Participating in this type of professional development may help teachers and schools overcome barriers associated with the use of technology.

Semi-structured questions were used to guide the personal interviews conducted within this study. The decision to use semi-structured interview questions was made purposefully to allow for organic thought with the hope of arriving at more meaningful material. In very clear terms Merriam contends "the interviewer-respondent interaction is a complex phenomenon (2009, p. 109). The complexities of the process were likely heightened due to the limited interviewing experience of the researcher. For instance, this approach did reveal interesting details about each interviewee, but it also expanded the topics of discussion at times, moving the conversation away from the original question. This resulted in more data to analyze and code. Additionally, each interviewee shared related but different information making it difficult to compare the extraneous data among participants. This data proved interesting in generating an understanding about each candidate and their perspectives but did not necessarily relate directly back to the questions asked.

This study examined the influence of technology self-efficacy on teachers because of their participation in a professional development experience. Studies related to self-efficacy are criticized in the literature because they rely on self-judgements and self-assessments (Pajares, 1996). The qualitative methodology used in this study created an opportunity to explore in depth the participants' experiences through their own testimony

and self-reflection. While the information obtained is useful in understanding how these teachers perceived their own development it nonetheless introduces biases.

The focus of this study was on the three cases identified and detailed extensively in the previous chapter, it is important to note that many of the ideas and thoughts shared by the three participants were echoed in the testimony of many other teachers who participated in the focus groups and surveys that were conducted within this study. Each participant had a unique perspective and interesting information to share about their experiences with technology.

Additional research could be conducted to expand our understanding of how teachers' belief systems intersect with their experiences and influences. The focus of this study was on teachers who maintained a positive attitude toward the use of technology in the classroom. It would be equally insightful to look in-depth at the teachers who did not look favorably on the use of technology. For example, there was testimony presented by some teachers who participated in the focus groups that suggested their beliefs about teaching did not support the use of technology in their classroom. For example, one teacher who described herself as a person over 35 who did not grow up with technology shared the following, "I do not appreciate technology just for the sake of technology I really do not appreciate it at all, I think we can spend so much time playing with technology and have a really fun time creating a cool colorful whatever it is but what I've done is taken time away from content" (F#1). It would be useful to study teachers who do not favor technology to better understand what types of experiences could more positively influence their opinion and use of technology.

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Appendix A

Contextual Overview of Professional Development

High School Geography Institute Course Outline

Monday June 17th, 2013.

8:15-9:15AM Course Introductions

Students will receive information about the week, be introduced to the NING Institute site and get other information regarding the application and integration of the content.

9:15-10:15AM – Political Geography

Introduce participants to the concepts of nation, state and nation state. This introduction to the political geography unit will allow students to see the interactions of culture and politics.

10:30-12:15 PM – Political Geography

Political geography discussing World Systems Theory. World Systems theory will relate concepts of economic development to ideas associated with political geography. World trade and concepts tying in with fundamental principals in World History will also be discussed.

1:00-1:15 PM

Interactive presentation to the Ning site for the Institute and show participants where to post resources and their projects for the weeks work.

1:15-2:30 PM

Demonstrate work on the AAG website that teachers can immediately use in their classrooms. This case study approach to political geography and nationalism takes a regional approach tying in the concepts of the political geography unit. Teachers will be interactively demonstrating and using the sites lessons in a variety of different regions around the world.

2:30-3:15 PM

The results of the technology survey that teachers were asked to take will be evaluated with the participants. Analysis of different uses of technology in the classrooms will be shown to participants evaluating ease of use and availability of technology in different constructs.

Tuesday, June 18th, 2013.

8:15-9:15 AM

This strand will focus on modern agriculture around the United States. There is a misperception about what agriculture is today. Agriculture is Minnesota's leading

industry yet many do not realize the process or even the product involved from farm to fork.

9:15-10:00 AM

Continue discussion of agriculture focusing on Minnesota. The process and the patterns will be discussed with an emphasis on the industrial production aspects of today's farmers.

10:00-10:15 AM

Focus on unique lessons tying in previous content presentation. Focus will be on tying in the content with the new Minnesota standards regarding agriculture. Teachers will receive hands-on lessons relating to agriculture around the United States and Minnesota.

10:30-12:15 PM

Focus during this strand will be on the current pedagogy in education today and how to assess student knowledge in a meaningful way. Teachers will be analyzing their current work and evaluating that with the new Bloom's taxonomy.

1:00-2:15 PM

In this presentation, participants will learn how maps are used to mislead readers. Participants will learn to analyze maps with a critical eye and different ways in which maps are used to mislead readers.

2:15-3:15 PM

The participants will be getting an introduction to GIS software through ESRI and receiving preparatory information regarding their map projects and time at the University of Minnesota on Wednesday.

Wednesday, June 19th, 2013.

8:15-10:15 AM

Participants will get hands-on training regarding the new technology standards in the Minnesota graduation standards. Teachers will learn the latest ESRI GIS software and how to import data to produce maps that they will use throughout their course using the six other units.

10:30-12:15 PM

Participants will continue their work with ESRI products on internet based tools to construct maps for their final projects.

1:15-3:15 PM

Participants will be receiving information on the usage of different technology applications and apps available for classroom use with an iPad or iPhone. Participants will also receive the latest pedagogy relating to the current practice of different technology in the classrooms.

Thursday, June 20th, 2013.

8:15-10:15 AM

Participants will be receiving information on the latest uses of Geothentic, an interactive geographical design environment, for their use in their classrooms. Participants will have the opportunity to work on one of three different scenarios in the Geothentic learning environment.

10:15-12:15 PM

Participants will continue their work with the Geothentic environment at the University of Minnesota Technology lab.

1:15-3:15 PM

Lead teachers will be available to assist participants as they begin to construct their three maps for the institute requirements. This two-hour time block will be used for participants to construct maps relating to the units in the geography course. Teachers will be tying in content with technology in this session.

Friday, June 21st, 2013.

8:15-9:15 AM

Students will be learning about the Internal Spatial Structure of Cities in both the United States and around the world. Many models exist of different urban settings around the world. Teachers will learn how to apply these models to their daily instruction in the Urbanization unit.

9:15-10:15 AM

During this session, students will learn about Borchert's Epochs of cities in United States looking at the historical development of cities in the United States.

10:15 – 12:15 PM

Discussion about how to work with urbanization with students. Different lessons will be shared that will tie into the standards in the state of Minnesota.

1:15-3:00 PM

Participants will use this time to present one of their maps that they constructed during the institute. The presentations will be no more than five minutes in length and show/demonstrate their knowledge of map design and content knowledge. Maps will be available for all to use on the Ning website.

3:00-3:15 PM – Institute Evaluation

Appendix B

Focus Group Participation Consent Form

Introduction

Consent Form

Thank you for participating in this focus group. We have gathered here today to hear about your experiences during the past week/4 months and identify areas that could be improved for future professional development programs. We also wish to understand your thoughts about the technological, pedagogical, and content knowledge framework.

My name is [Wendy Knapp] and I will be moderating this focus group. I will be asking you a series of general questions and I will be taking notes. We will also audiotape your comments to help us think about what is being said. All comments will remain completely anonymous and confidential. We will never reveal any information about you that can be linked to your identity.

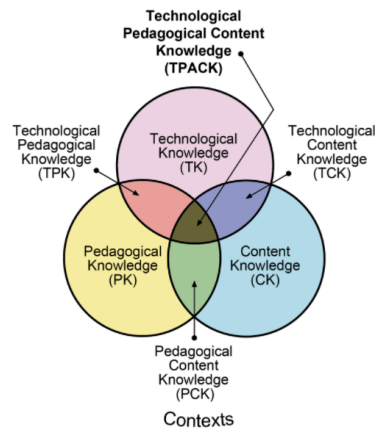
Please feel free to address one another, not just the moderator. Both positive and negative comments are welcomed. There are not right or wrong answers. We expect to hear different points of view.

The session will go on no longer than 60 minutes, with no break. You may leave the session at any time if you wish.

Appendix C

TPACK Worksheet

NAME _____



JUSTIFICATION:

Appendix D

Focus Group Questions

Focus Group Questions

Anticipated focus group questions after the weeklong face-to-face workshop

1. How would you describe your experience with the program during the past week?
2. What are some challenges that you may experience with technology integration after the workshop?
3. What do you think about the technological, pedagogical, and content knowledge framework? What do you think about the strengths and weaknesses of it?
4. What about this workshop has been most valuable to you?
5. Is there anything else you'd like to share with us?

Anticipated focus group questions at the completion of the program

1. How would you describe your experiences with technology integration for the past few months?
2. What are some challenges that you have experienced during the implementation of this activity?
3. What do you think about the technological, pedagogical, and content knowledge framework? What do you think about the strengths and weaknesses of it?
4. What about this workshop has been most valuable to you?
5. Is there anything else you'd like to share with us?

Appendix E
Interview Request Letter

Dear [],

I'm writing to you because you've already generously given your time to participate in focus groups during the MAGE institute. Through your willingness to share your opinions and ideas I have learned much about your experiences with MAGE and classroom technology integration.

As a follow-up to the focus group discussion I am interested in interviewing you individually to better understand your unique perspective on technology integration. The interview can be done over the telephone and will last approximately 30 minutes. In exchange for your time I will send you a \$10 Target gift.

Participation in this interview is voluntary. Please strongly consider granting this interview as your insights are very valuable to improving professional development. All data is being collected in accordance with the University of Minnesota Internal Review Board policies.

I sincerely appreciate your time and consideration. If possible, I would like to schedule the interview between December 2 and December 20, 2013. If you are willing to participate, please email me with a date and time that works best for you.

Thanks for your time,
Wendy

Appendix F

Personal Interview Questions

Interview Questions

1. How is your school year going?
2. What courses are you teaching? Are they new?
3. What is the technology climate in your building?
4. What is your experience using technology in the classroom?
5. How would you describe your attitude toward technology in the classroom?
6. Did you come into teaching comfortable with technology?
7. How confident do you feel in your ability to use technology in your teaching?
8. Do you use technology in your classroom because you want to or believe you have to?
9. Do you feel you have support?
10. Are you using technology in all courses? Which ones? Why or why not?
11. If you use technology, how do you decide when and how to use technology?
12. Do you feel your content knowledge impacts your decision to use technology?
13. Do you feel your pedagogical knowledge impacts your decision to use technology?
14. When if technology failed/didn't go as planned how do you feel?
15. What was your response to the experience?
16. Did you try it again?
17. What did you modify? Method/lesson, content, technology?